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2010−04

Processes



Air Plasma Cutting and Gouging

Description

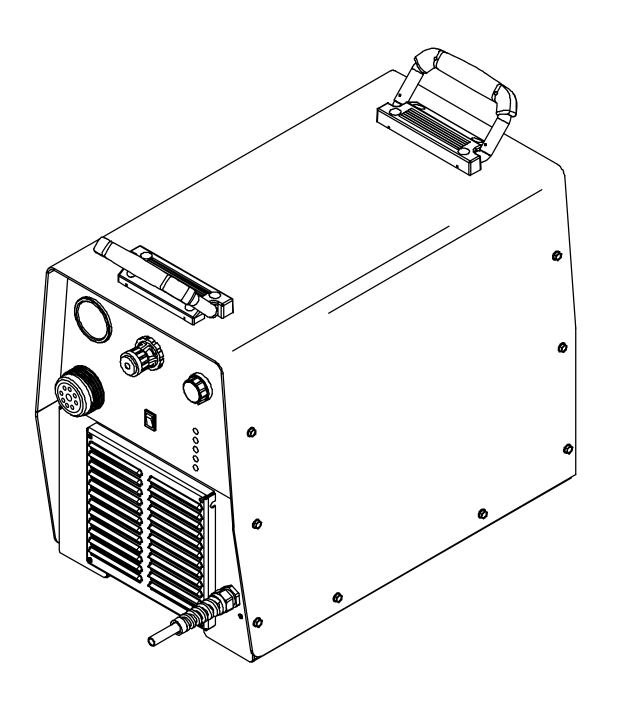






Air Plasma Cutter

Spectrum® 2050
(55 Amp)



OWNER'S MANUAL

File: Plasma Cutters





Visit our website at

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From Miller to You

Thank you and *congratulations* on choosing Miller. Now you can get the job done and get it done right. We know you don't have time to do it any other way.

That's why when Niels Miller first started building arc welders in 1929, he made sure his products offered long-lasting value and superior quality. Like you, his customers couldn't afford anything less. Miller products had to be more than the best they could be. They had to be the best you could buy.

Today, the people that build and sell Miller products continue the tradition. They're just as committed to providing equipment and service that meets the high standards of quality and value established in 1929.

This Owner's Manual is designed to help you get the most out of your Miller products. Please take time to read the Safety precautions. They will help you protect yourself against potential hazards on the worksite. We've made installation and operation quick and easy. With Miller you can count on years of reliable service with proper maintenance. And if for some reason the unit needs repair, there's a Troubleshooting section that will help you figure out what the problem is. The parts list will then help you to decide the exact part you may need to fix the problem. Warranty and service information for your particular model are also provided.



Miller is the first welding equipment manufacturer in the U.S.A. to be registered to the ISO 9001 Quality System Standard.

Miller Electric manufactures a full line of welders and welding related equipment. For information on other quality Miller products, contact your local Miller distributor to receive the latest full line catalog or individual specification sheets. **To locate your nearest distributor or service agency call 1-800-4-A-Miller, or visit us at www.MillerWelds.com on the web.**



Working as hard as you do – every power source from Miller is backed by the most hassle-free warranty in the business.



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SECTION 1 – SAFETY PRECAUTIONS - READ BEFORE USING

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Protect yourself and others from injury — read and follow these precautions.

1-1. Symbol Usage



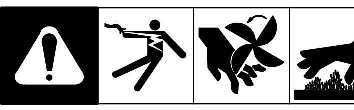
DANGER! – Indicates a hazardous situation which, if not avoided, will result in death or serious injury. The possible hazards are shown in the adjoining symbols or explained in the text.



Indicates a hazardous situation which, if not avoided, could result in death or serious injury. The possible hazards are shown in the adjoining symbols or explained in the text.

NOTICE *– Indicates statements not related to personal injury.*

☞ *Indicates special instructions.*



This group of symbols means Warning! Watch Out! ELECTRIC SHOCK, MOVING PARTS, and HOT PARTS hazards. Consult symbols and related instructions below for necessary actions to avoid the hazards.

1-2. Plasma Arc Cutting Hazards



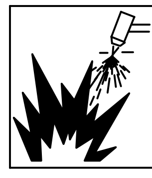
The symbols shown below are used throughout this manual to call attention to and identify possible hazards. When you see the symbol, watch out, and follow the related instructions to avoid the hazard. The safety information given below is only a summary of the more complete safety information found in the Safety Standards listed in Section 1-5. Read and follow all Safety Standards.



Only qualified persons should install, operate, maintain, and repair this unit.



During operation, keep everybody, especially children, away.



CUTTING can cause fire or explosion.

Hot metal and sparks blow out from the cutting arc. The flying sparks and hot metal, hot workpiece, and hot equipment can cause fires and burns. Check and be sure the area is safe before doing any cutting.

- Remove all flammables within 35 ft (10.7 m) of the cutting arc. If this is not possible, tightly cover them with approved covers.
- Do not cut where flying sparks can strike flammable material.
- Protect yourself and others from flying sparks and hot metal.
- Be alert that sparks and hot materials from cutting can easily go through small cracks and openings to adjacent areas.
- Watch for fire, and keep a fire extinguisher nearby.
- Be aware that cutting on a ceiling, floor, bulkhead, or partition can cause fire on the hidden side.
- Do not cut on closed containers such as tanks or drums.
- Connect work cable to the work as close to the cutting area as practical to prevent cutting current from traveling long, possibly unknown paths and causing electric shock, sparks, and fire hazards.
- Do not use plasma cutter to thaw frozen pipes.
- Never cut containers with potentially flammable materials inside – they must be emptied and properly cleaned first.
- Do not cut where the atmosphere may contain flammable dust, gas, or liquid vapors (such as gasoline).
- Do not cut pressurized cylinders, pipes, or vessels.
- Do not cut containers that have held combustibles.
- Wear oil-free protective garments such as leather gloves, heavy shirt, cuffless trousers, high shoes, and a cap.
- Do not locate unit on or over combustible surfaces.
- Remove any combustibles, such as a butane lighter or matches, from your person before doing any cutting.
- After completion of work, inspect area to ensure it is free of sparks, glowing embers, and flames.
- Use only correct fuses or circuit breakers. Do not oversize or bypass them.
- Follow requirements in OSHA 1910.252 (a) (2) (iv) and NFPA 51B for hot work and have a fire watcher and extinguisher nearby.



ELECTRIC SHOCK can kill.

Touching live electrical parts can cause fatal shocks or severe burns. The torch and work circuit are electrically live whenever the output is on. The input power circuit and machine internal circuits are also live when power is on. Plasma arc cutting requires higher voltages than welding to start and maintain the arc (200 to 400 volts dc are common), but may also use torches designed with safety interlock systems which turn off the machine when the shield cup is loosened or if tip touches electrode inside the nozzle. Incorrectly installed or improperly grounded equipment is a hazard.

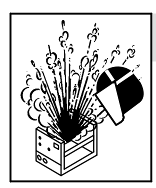
- Do not touch live electrical parts.
- Wear dry, hole-free insulating gloves and body protection.
- Insulate yourself from work and ground using dry insulating mats or covers big enough to prevent any physical contact with the work or ground.
- Do not touch torch parts if in contact with the work or ground.
- Turn off power before checking, cleaning, or changing torch parts.
- Disconnect input power before installing or servicing this equipment. Lockout/tagout input power according to OSHA CFR 1910.147 (see Safety Standards).
- Properly install and ground this equipment according to its Owner's Manual and national, state, and local codes.
- Check and be sure that input power cord ground wire is properly connected to ground terminal in disconnect box or that cord plug is connected to a properly grounded receptacle outlet – always verify the supply ground.
- When making input connections, attach proper grounding conductor first.
- Keep cords dry, free of oil and grease, and protected from hot metal and sparks.
- Frequently inspect input power cord for damage or bare wiring – replace cord immediately if damaged – bare wiring can kill.
- Turn off all equipment when not in use.
- Inspect and replace any worn or damaged torch cable leads.
- Do not wrap torch cable around your body.
- Ground the workpiece to a good electrical (earth) ground if required by codes.
- Use only well-maintained equipment. Repair or replace damaged parts at once.
- Wear a safety harness if working above floor level.
- Keep all panels and covers securely in place.
- Do not bypass or try to defeat the safety interlock systems.
- Use only torch(es) specified in Owner's Manual.
- Keep away from torch tip and pilot arc when trigger is pressed.
- Clamp work cable with good metal-to-metal contact to workpiece (not piece that will fall away) or worktable as near the cut as practical.
- Insulate work clamp when not connected to workpiece to prevent contact with any metal object.



ELECTRIC SHOCK can kill.

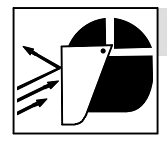
SIGNIFICANT DC VOLTAGE exists in inverter power sources AFTER the removal of input power.

- Turn Off unit, disconnect input power, check voltage on input capacitors, and be sure it is near zero (0) volts before touching any parts. Check capacitors according to instructions in Maintenance Section of Owner's Manual or Technical Manual before touching any parts.



EXPLODING PARTS can injure.

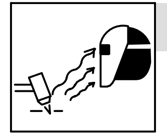
- On inverter power sources, failed parts can explode or cause other parts to explode when power is applied. Always wear a face shield and long sleeves when servicing inverters.



FLYING SPARKS can injure.

Sparks and hot metal blow out from the cutting arc. Chipping and grinding cause flying metal.

- Wear approved face shield or safety goggles with side shields.
- Wear proper body protection to protect skin.
- Wear flame-resistant ear plugs or ear muffs to prevent sparks from entering ears.

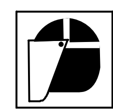
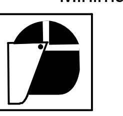


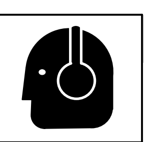
ARC RAYS can burn eyes and skin.

Arc rays from the cutting process produce intense visible and invisible (ultraviolet and infrared) rays that can burn eyes and skin.

- Wear face protection (helmet or shield) with a proper shade of filter lenses to protect your face and eyes from arc rays and sparks when cutting or watching. ANSI Z49.1 (see Safety Standards) suggests a No. 9 shade (with No. 8 as minimum) for all cutting currents less than 300 amperes. Z49.1 adds that lighter filter shades may be used when the arc is hidden by the workpiece. As this is normally the case with low current cutting, the shades suggested in Table 1 are provided for the operator's convenience.
- Wear approved safety glasses with side shields under your helmet or shield.
- Use protective screens or barriers to protect others from flash, glare and sparks; warn others not to watch the arc.
- Wear protective clothing made from durable, flame-resistant material (leather, heavy cotton, or wool) and foot protection.

Table 1. Eye Protection For Plasma Arc Cutting

Current Level In Amperes		Minimum Shade Number
Below 20	 	#4
20 – 40		#5
40 – 60		#6
60 – 100		#8



NOISE can damage hearing.

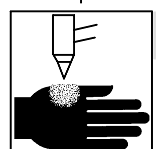
Prolonged noise from some cutting applications can damage hearing if levels exceed limits specified by OSHA (see Safety Standards).

- Use approved ear plugs or ear muffs if noise level is high.
- Warn others nearby about noise hazard.

FUMES AND GASES can be hazardous.

Cutting produces fumes and gases. Breathing these fumes and gases can be hazardous to your health.

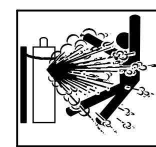
- Keep your head out of the fumes. Do not breathe the fumes.
- If inside, ventilate the area and/or use local forced ventilation at the arc to remove cutting fumes and gases.
- If ventilation is poor, wear an approved air-supplied respirator.
- Read and understand the Material Safety Data Sheets (MSDSs) and the manufacturer's instruction for metals to be cut, coatings, and cleaners.
- Work in a confined space only if it is well ventilated, or while wearing an air-supplied respirator. Fumes from cutting and oxygen depletion can alter air quality causing injury or death. Be sure the breathing air is safe.
- Do not cut in locations near degreasing, cleaning, or spraying operations. The heat and rays of the arc can react with vapors to form highly toxic and irritating gases.
- Do not cut on coated metals, such as galvanized, lead, or cadmium plated steel, unless the coating is removed from the cutting area, the area is well ventilated, and while wearing an air-supplied respirator. The coatings and any metals containing these elements can give off toxic fumes when cut.
- Do not cut containers with toxic or reactive materials inside or containers that have held toxic or reactive materials – they must be emptied and properly cleaned first.



PLASMA ARC can injure.

The heat from the plasma arc can cause serious burns. The force of the arc adds greatly to the burn hazard. The intensely hot and powerful arc can quickly cut through gloves and tissue.

- Keep away from the torch tip.
- Do not grip material near the cutting path.
- The pilot arc can cause burns – keep away from torch tip when trigger is pressed.
- Wear proper flame-retardant clothing covering all exposed body areas.
- Point torch away from your body and toward work when pressing the torch trigger – pilot arc comes on immediately.
- Turn off power source and disconnect input power before disassembling torch or changing torch parts.
- Use only torch(es) specified in the Owner's Manual.



CYLINDERS can explode if damaged.

Gas cylinders contain gas under high pressure. If damaged, a cylinder can explode. Since gas cylinders are normally part of metalworking processes, be sure to treat them carefully.

- Protect compressed gas cylinders from excessive heat, mechanical shocks, physical damage, slag, open flame, sparks, and arcs.
- Install and secure cylinders in an upright position by chaining them to a stationary support or equipment cylinder rack to prevent falling or tipping.
- Keep cylinders away from any cutting or other electrical circuits.
- Never allow electrical contact between a plasma arc torch and a cylinder.
- Never cut on a pressurized cylinder – explosion will result.
- Use only correct gas cylinders, regulators, hoses, and fittings designed for the specific application; maintain them and associated parts in good condition.
- Turn face away from valve outlet when opening cylinder valve.
- Keep protective cap in place over valve except when cylinder is in use or connected for use.
- Use the right equipment, correct procedures, and sufficient number of persons to lift and move cylinders.
- Read and follow instructions on compressed gas cylinders, associated equipment, and Compressed Gas Association (CGA) publication P-1 listed in Safety Standards.

1-3. Additional Symbols For Installation, Operation, And Maintenance



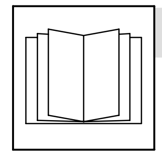
HOT PARTS can burn.

- Do not touch hot parts bare handed.
- Allow cooling period before working on equipment.
- To handle hot parts, use proper tools and/or wear heavy, insulated welding gloves and clothing to prevent burns.



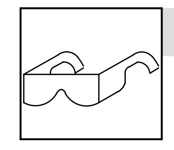
MOVING PARTS can injure.

- Keep away from moving parts such as fans.
- Keep all doors, panels, covers, and guards closed and securely in place.
- Have only qualified persons remove doors, panels, covers, or guards for maintenance and troubleshooting as necessary.
- Reinstall doors, panels, covers, or guards when maintenance is finished and before reconnecting input power.



READ INSTRUCTIONS.

- Read and follow all labels and the Owner's Manual carefully before installing, operating, or servicing unit. Read the safety information at the beginning of the manual and in each section.
- Use only genuine replacement parts from the manufacturer.
- Perform maintenance and service according to the Owner's Manuals, industry standards, and national, state, and local codes.



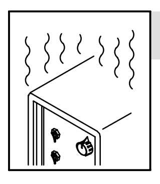
FLYING METAL or DIRT can injure eyes.

- Wear safety glasses with side shields or wear face shield.



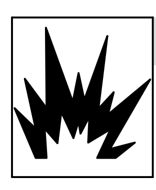
ELECTRIC AND MAGNETIC FIELDS (EMF) can affect Implanted Medical Devices.

- Wearers of Pacemakers and other Implanted Medical Devices should keep away.
- Implanted Medical Device wearers should consult their doctor and the device manufacturer before going near arc welding, spot welding, gouging, plasma arc cutting, or induction heating operations.



OVERUSE can cause OVERHEATING.

- Allow cooling period; follow rated duty cycle.
- Reduce amperage (thickness) or reduce duty cycle before starting to cut again.



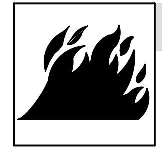
EXPLODING HYDROGEN hazard.

- When cutting aluminum underwater or with the water touching the underside of the aluminum, free hydrogen gas may collect under the work-piece.
- See your cutting engineer and water table instructions for help.



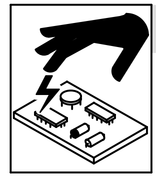
FALLING EQUIPMENT can injure.

- Use lifting eye to lift unit only, NOT running gear, gas cylinders, or any other accessories.
- Use equipment of adequate capacity to lift unit.
- If using lift forks to move unit, be sure forks are long enough to extend beyond opposite side of unit.
- Keep equipment (cables and cords) away from moving vehicles when working from an aerial location.
- Follow the guidelines in the Applications Manual for the Revised NIOSH Lifting Equation (Publication No. 94−110) when manually lifting heavy parts or equipment.



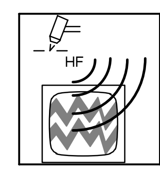
FIRE OR EXPLOSION hazard.

- Do not locate unit on, over, or near combustible surfaces.
- Do not install unit near flammables.
- Do not overload building wiring − be sure power supply system is properly sized, rated, and protected to handle this unit.



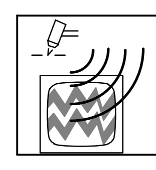
STATIC (ESD) can damage PC boards.

- Put on grounded wrist strap BEFORE handling boards or parts.
- Use proper static-proof bags and boxes to store, move, or ship PC boards.



H.F. RADIATION can cause interference.

- High frequency (H.F.) can interfere with radio navigation, safety services, computers, and communications equipment.
- Have only qualified persons familiar with electronic equipment perform this installation.
- The user is responsible for having a qualified electrician promptly correct any interference problem resulting from the installation.
- If notified by the FCC about interference, stop using the equipment at once.
- Have the installation regularly checked and maintained.
- Keep high-frequency source doors and panels tightly shut, keep spark gaps at correct setting, and use grounding and shielding to minimize the possibility of interference.



ARC CUTTING can cause interference.

- Electromagnetic energy can interfere with sensitive electronic equipment such as computers and computer-driven equipment such as robots.
- To reduce possible interference, keep cables as short as possible, close together, and down low, such as on the floor.
- Locate cutting operation 100 meters from any sensitive electronic equipment.
- Be sure this cutting power source is installed and grounded according to this manual.
- If interference still occurs, the user must take extra measures such as moving the machine, using shielded cables, using line filters, or shielding the work area.

1-4. California Proposition 65 Warnings



Welding or cutting equipment produces fumes or gases which contain chemicals known to the State of California to cause birth defects and, in some cases, cancer. (California Health & Safety Code Section 25249.5 et seq.)



Battery posts, terminals and related accessories contain lead and lead compounds, chemicals known to the State of California to cause cancer and birth defects or other reproductive harm. *Wash hands after handling.*



This product contains chemicals, including lead, known to the state of California to cause cancer, birth defects, or other reproductive harm. *Wash hands after use.*

For Gasoline Engines:



Engine exhaust contains chemicals known to the State of California to cause cancer, birth defects, or other reproductive harm.

For Diesel Engines:



Diesel engine exhaust and some of its constituents are known to the State of California to cause cancer, birth defects, and other reproductive harm.

1-5. Principal Safety Standards

Safety in Welding, Cutting, and Allied Processes, ANSI Standard Z49.1, from Global Engineering Documents (phone: 1-877-413-5184, website: www.global.ihs.com).

Recommended Practices for Plasma Arc Cutting and Gouging, American Welding Society Standard AWS C5.2, from Global Engineering Documents (phone: 1-877-413-5184, website: www.global.ihs.com).

Safe Practices for the Preparation of Containers and Piping for Welding and Cutting, American Welding Society Standard AWS F4.1, from Global Engineering Documents (phone: 1-877-413-5184, website: www.global.ihs.com).

National Electrical Code, NFPA Standard 70, from National Fire Protection Association, Quincy, MA 02269 (phone: 1-800-344-3555, website: www.nfpa.org and www. sparky.org).

Safe Handling of Compressed Gases in Cylinders, CGA Pamphlet P-1, from Compressed Gas Association, 4221 Walney Road, 5th Floor, Chantilly, VA 20151 (phone: 703-788-2700, website:www.cganet.com).

Safety in Welding, Cutting, and Allied Processes, CSA Standard W117.2, from Canadian Standards Association, Standards Sales, 5060 Spectrum Way, Suite 100, Ontario, Canada L4W 5NS (phone: 800-463-6727, website: www.csa-international.org).

Safe Practice For Occupational And Educational Eye And Face Protection, ANSI Standard Z87.1, from American National Standards Institute, 25 West 43rd Street, New York, NY 10036 (phone: 212-642-4900, website: www.ansi.org).

Standard for Fire Prevention During Welding, Cutting, and Other Hot Work, NFPA Standard 51B, from National Fire Protection Association, Quincy, MA 02269 (phone: 1-800-344-3555, website: www.nfpa.org.

OSHA, Occupational Safety and Health Standards for General Industry, Title 29, Code of Federal Regulations (CFR), Part 1910, Subpart Q, and Part 1926, Subpart J, from U.S. Government Printing Office, Superintendent of Documents, P.O. Box 371954, Pittsburgh, PA 15250-7954 (phone: 1-866-512-1800) (there are 10 OSHA Regional Offices—phone for Region 5, Chicago, is 312-353-2220, website: www.osha.gov).

Applications Manual for the Revised NIOSH Lifting Equation, The National Institute for Occupational Safety and Health (NIOSH), 1600 Clifton Rd, Atlanta, GA 30333 (phone: 1-800-232-4636, website: www.cdc.gov/NIOSH).

1-6. EMF Information

Electric current flowing through any conductor causes localized electric and magnetic fields (EMF). Welding current creates an EMF field around the welding circuit and welding equipment. EMF fields may interfere with some medical implants, e.g. pacemakers. Protective measures for persons wearing medical implants have to be taken. For example, access restrictions for passers−by or individual risk assessment for welders. All welders should use the following procedures in order to minimize exposure to EMF fields from the welding circuit:

1. Keep cables close together by twisting or taping them, or using a cable cover.
2. Do not place your body between welding cables. Arrange cables to one side and away from the operator.
3. Do not coil or drape cables around your body.
4. Keep head and trunk as far away from the equipment in the welding circuit as possible.
5. Connect work clamp to workpiece as close to the weld as possible.
6. Do not work next to, sit or lean on the welding power source.
7. Do not weld whilst carrying the welding power source or wire feeder.

About Implanted Medical Devices:

Implanted Medical Device wearers should consult their doctor and the device manufacturer before performing or going near arc welding, spot welding, gouging, plasma arc cutting, or induction heating operations. If cleared by your doctor, then following the above procedures is recommended.

SECTION 2 – CONSIGNES DE SÉCURITÉ – LIRE AVANT UTILISATION

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 **Se protéger et protéger les autres contre le risque de blessure — lire et respecter ces consignes.**

2-1. Signification des symboles



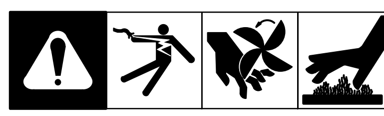
DANGER! − Indique une situation dangereuse qui si on l'évite pas peut donner la mort ou des blessures graves. Les dangers possibles sont montrés par les symboles joints ou sont expliqués dans le texte.



Indique une situation dangereuse qui si on l'évite pas peut donner la mort ou des blessures graves. Les dangers possibles sont montrés par les symboles joints ou sont expliqués dans le texte.

NOTE *− Indique des déclarations pas en relation avec des blessures personnelles.*

☞ *Indique des instructions spécifiques.*



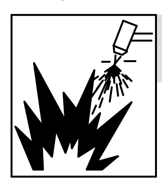
Ce groupe de symboles veut dire Avertissement! Attention! DANGER DE CHOC ELECTRIQUE, PIECES EN MOUVEMENT, et PIECES CHAUDES. Consulter les symboles et les instructions ci-dessous y afférant pour les actions nécessaires afin d'éviter le danger.

2-2. Dangers liés au coupage à l'arc au plasma

Les symboles présentés ci-après sont utilisés tout au long du présent manuel pour attirer votre attention et identifier les risques de danger. Lorsque vous voyez un symbole, soyez vigilant et suivez les directives mentionnées afin d'éviter tout danger. Les consignes de sécurité présentées ci-après ne font que résumer l'information contenue dans les normes de sécurité énumérées à la section 1-5. Veuillez lire et respecter toutes ces normes de sécurité.

 **L'installation, l'utilisation, l'entretien et les réparations ne doivent être confiés qu'à des personnes qualifiées.**

 **Au cours de l'utilisation, tenir toute personne à l'écart et plus particulièrement les enfants.**



LE COUPAGE présente un risque de feu ou d'explosion.

Des particules de métal chaud et des étincelles peuvent jaillir de la pièce au moment du coupage. Les étincelles et le métal chaud, la pièce à couper chauffée et l'équipement chaud peuvcnt causer un feu ou des brûlures. Avant de commencer à travailler, assurez-vous que l'endroit est sécuritaire.

- Déplacez toute matière inflammable se trouvant à l'intérieur d'un périmètre de 10,7 m (35 pi) de la pièce à couper. Si cela est impossible, vous devez les couvrir avec des housses approuvées et bien ajustées.
- Ne coupez pas dans un endroit où des étincelles pourraient atteindre des matières inflammables.
- Protégez−vous, ainsi que toute autre personne travaillant sur les lieux, contre les étincelles et le métal chaud.
- Assurez−vous qu'aucune étincelle ni particule de métal ne peut se glisser dans de petites fissures ou tomber dans d'autres pièces.
- Afin d'éliminer tout risque de feu, soyez vigilant et gardez toujours un extincteur à la portée de la main.
- Si vous coupez sur un plafond, un plancher ou une cloison, soyez conscient que cela peut entraîner un feu de l'autre côté.
- Ne coupez pas sur un contenant fermé tel qu'un réservoir ou un bidon.
- Fixez le câble de masse sur la pièce à couper, le plus près possible de la zone à couper afin de prévenir que le courant de coupage ne prenne une trajectoire inconnue ou longue et ne cause ainsi une décharge électrique, d'étincelles ou un feu.
- Ne pas utiliser le coupeur plasma pour dégeler des conduites gelées.
- Ne coupez jamais des contenants qui peuvent contenir des matières inflammables. Vous devez en premier lieu les vider et les nettoyer convenablement.
- Ne coupez pas quand l'atmosphère peut contenir des poussières, gaz ou vapeurs (comme l'essence) inflammables.
- Ne coupez pas dans un endroit où l'atmosphère risque de contenir de la poussière ou des vapeurs explosives.
- Ne coupez pas de bouteilles, de tuyaux ou de contenants pressurisés.
- Ne coupez pas de contenants qui ont déjà reçu des combustibles.
- Portez des vêtements de protection exempts d'huile tels que des gants en cuir, une veste résistante, des pantalons sans revers, des bottes et un casque.
- Ne placez pas le poste sur une surface combustible ou au−dessus de celle−ci.
- Une fois le travail achevé, assurez−vous qu'il ne reste aucune trace d'étincelles incandescentes ni de flammes.
- Utiliser exclusivement des fusibles ou coupe−circuits appropriés. Ne pas augmenter leur puissance; ne pas les ponter.
- Avant le coupage, retirez tout combustible de vos poches, par exemple un briquet au butane ou des allumettes.



UN CHOC ÉLECTRIQUE peut tuer.

Touching live electrical parts can cause fatal shocks or severe burns. The torch and work circuit are electrically live whenever the output is on. The input power circuit and machine internal circuits are also live when power is on. Le coupage plasma nécessite des tensions plus importantes que le soudage pour amorcer et maintenir l'arc (200 à 400VDC est typique), mais peut être utilisé avec des torches équipées de systèmes de verrouillage de sécurité qui arrêtent la machine en cas de buse desserrée ou si l'électrode touche la tuyère. Incorrectly installed or improperly grounded equipment is a hazard.

- Ne touchez pas aux pièces électriques sous tension.
- Portez des gants isolants et des vêtements de protection secs et sans trous.
- Isolez−vous de la pièce à couper et du sol en utilisant des housses ou des tapis assez grands afin d'éviter tout contact physique avec la pièce à couper ou le sol.
- Ne touchez pas aux pièces du chalumeau si vous êtes en contact avec la pièce à couper ou le sol.
- Mettez l'appareil hors tension avant d'effectuer la vérification, le nettoyage ou le changement d'une pièce du chalumeau.
- Coupez l'alimentation d'entrée avant d'installer l'appareil ou d'effectuer l'entretien. Verrouillez ou étiquetez la sortie d'alimentation selon la norme OSHA 29 CFR 1910.147 (reportez−vous aux Principales normes de sécurité).
- Installez le poste correctement et mettez-le à la terre convenablement selon les consignes du manuel de l'opérateur et les normes nationales, provinciales et locales.

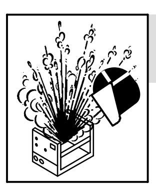
- Assurez−vous que le fil de terre du cordon d’alimentation est correctement relié à la borne de terre dans la boîte de coupure ou que la fiche du cordon est branchée à une prise correctement mise à la terre − vous devez toujours vérifier la mise à la terre.
- Avant d’effectuer les connexions d’alimentation, vous devez relier le bon fil de terre.
- Les câbles doivent être exempts d’humidité, d’huile et de graisse; protégez−les contre les étincelles et les pièces métalliques chaudes.
- Vérifiez fréquemment le cordon d’alimentation afin de vous assurer qu’il n’est pas altéré ou à nu, remplacez−le immédiatement s’il l’est. Un fil à nu peut entraîner la mort.
- L’équipement doit être hors tension lorsqu’il n’est pas utilisé.
- Vérifiez et remplacez les cosses du câble du chalumeau si elles sont usées ou altérées.
- Le câble du chalumeau ne doit pas s’enrouler autour de votre corps.
- Si les normes le stipulent, la pièce à couper doit être mise à la terre.
- Utilisez uniquement de l’équipement en bonne condition. Réparez ou remplacez immédiatement toute pièce altérée.
- Portez un harnais de sécurité si vous devez travailler au−dessus du sol.
- Assurez−vous que tous les panneaux et couvercles sont correctement en place.
- N’essayez pas d’aller à l’encontre des systèmes de verrrouillage de sécurité ou de les contourner.
- Utilisez uniquement le ou les chalumeaux recommandés dans le manuel de l’opérateur.
- N’approchez pas le tube du chalumeau et l’arc pilote lorsque la gâchette est enfoncée.
- Le câble de masse doit être pincé correctement sur la pièce à couper, métal contre métal (et non de telle sorte qu’il puisse se détacher), ou sur la table de travail le plus près possible de la ligne de coupage.
- Isoler la pince de masse quand pas mis à la pièce pour éviter le contact avec tout objet métallique.



DÉCHARGES ÉLECTRIQUES potentiellement mortelles.

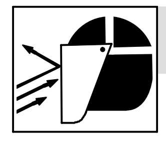
Il reste une TENSION DC NON NÉGLIGEABLE dans les sources de soudage onduleur UNE FOIS l’alimentation coupée.

- Mettre l’unité hors tension, mesurer la tension des condensateurs d’entrée et s’assurer qu’elle est pratiquement nulle avant de toucher à l’une quelconque des pièces. Mesurer cette tension conformément aux directives énoncées à la section Entretien du manuel de l’utilisateur ou du manuel technique avant de toucher à l’une quelconque des pièces.



Risque de blessure en cas D’EXPLOSION DES PIÈCES.

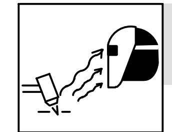
- Mise sous tension, toute pièce défectueuse des sources d’alimentation de l’inverseur peut exploser ou faire exploser d’autres pièces. Pour entretenir les inverseurs, toujours porter un masque protecteur et un vêtement à manches longues.



LES ÉTINCELLES PROJETÉES peuvent provoquer des blessures.

Le coupage plasma produit des étincelles et projections de métal à très haute température. Lorsque la pièce refroidit, du laitier peut se former.

- Portez une visière ou des lunettes de sécurité avec des écrans latéraux approuvées.
- Portez des vêtements de protection adéquats afin de protéger votre peau.
- Ayez recours à des protège−tympans ou à un serre−tête ignifuges afin d’éviter que les étincelles n’entrent dans vos oreilles.



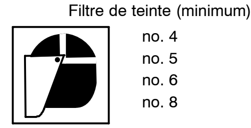
LES RAYONS D’ARC peuvent entraîner des brûlures aux yeux et à la peau.

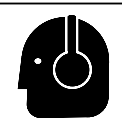
Les rayons d’arc provenant du procédé de coupage produisent des rayons visibles et invisibles intenses (ultraviolets et infrarouges) qui peuvent entraîner des brûlures aux yeux et à la peau.

- Une protection faciale (casque ou masque) avec des lunettes filtrantes de teinte adéquate est indispensable pour protéger le visage et les yeux des rayonnements de l’arc et des étincelles pendant la découpe ou en regardant simplement ANSI Z49.1 (reportez−vous aux Principales normes de sécurité) suggère d’utiliser un filtre de teinte n○ 9 (n○ 8 étant le minimum) pour tout travail de coupage faisant appel à un courant de moins de 300 A. On mentionne également dans la norme Z49.1 qu’un filtre plus faible peut être utilisé lorsque l’arc est caché par la pièce à couper. Comme cela est habituellement le cas pour les travaux de coupage à faible courant, les teintes énumérées au tableau 1 sont fournies à titre d’information pour l’opérateur.
- Porter des lunettes de sécurité à coques latérales sous votre casque ou écran facial.
- Ayez recours à des écrans protecteurs ou à des rideaux pour protéger les autres contre les rayonnements, les étincelles et les éblouissements; prévenez toute personne sur les lieux de ne pas regarder l’arc.
- Portez des vêtements confectionnés avec des matières résistantes et ignifuges (cuir, coton lourd ou laine) et des bottes de protection.

Tableau 1. Protection des yeux pour le coupage au plasma d’arc

Intensité de courant en ampères	Filtre de teinte (minimum)
Moins de 20	no. 4
20 − 40	no. 5
40 − 60	no. 6
60 − 100	no. 8

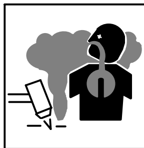




LE BRUIT peut endommager l’ouïe.

Certaines applications de coupage produisent un bruit constant, ce qui peut endommager l’ouïe si le niveau sonore dépasse les limites permises par l’OSHA (reportez−vous aux Principales normes de sécurité).

- Utilisez des protège−tympans ou un serre−tête antibruit si le niveau sonore est élevé.
- Prévenez toute personne sur les lieux du danger relié au bruit.

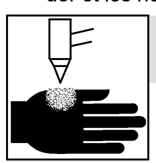


LES FUMÉES ET LES GAZ peuvent être dangereux.

Le coupage produit des vapeurs et des gaz. Respirer ces vapeurs et ces gaz peut être dangereux pour la santé.

- Ne mettez pas votre tête au−dessus des vapeurs. Ne respirez pas ces vapeurs.
- Si vous êtes à l’intérieur au moment du coupage, ventilez la pièce ou ayez recours à une ventilation aspirante installée près de l’arc pour évacuer les vapeurs et les gaz.
- Si la ventilation est médiocre, utilisez un respirateur anti−vapeurs approuvé.
- Lire et comprendre les spécifications de sécurité des matériaux (MSDS) et les instructions du fabricant concernant les métaux, les consommables, les revêtements, les nettoyants et les dégraisseurs.
- Travaillez dans un espace restreint uniquement s’il est bien ventilé ou si vous portez un respirateur anti−vapeurs. Les vapeurs causées par le coupage et l’épuisement de l’oxygène peuvent altérer la qualité de l’air et entraîner des blessures ou la mort. Assurez−vous que l’air ambiant est sain pour la santé.

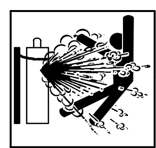
- Ne coupez pas dans un endroit près d'opérations de décapage, de nettoyage ou de vaporisation. La chaleur et les rayons d'arc peuvent réagir avec les vapeurs et former des gaz hautement toxiques et irritants.
- Ne coupez pas des métaux enrobés tels que des métaux galvanisés, contenant du plomb ou de l'acier plaqué au cadmium, à moins que l'enrobage ne soit ôté de la surface du métal à couper, que l'endroit où vous travaillez ne soit bien ventilé, ou que vous ne portiez un respirateur anti−vapeurs. Les enrobages ou tous métaux qui contiennent ces éléments peuvent créer des vapeurs toxiques s'ils sont coupés.
- Ne coupez pas de contenants qui renferment ou ont renfermés des matières toxiques ou réactives − vous devez en premier lieu les vider et les nettoyer convenablement.



L'ARC PLASMA peut provoquer des blessures.

La chaleur dégagée par le plasma d'arc peut entraîner de sérieuses brûlures. La force de l'arc est un facteur qui s'ajoute au danger de brûlures. La chaleur intense et la puissance de l'arc peuvent rapidement passer au travers de gants et de tissus.

- N'approchez pas le tube du chalumeau.
- Ne saisissez pas la pièce à couper près de la ligne de coupage.
- L'arc pilote peut causer des brûlures − n'approchez pas le tube du chalumeau lorsque vous avez appuyé sur le gâchette.
- Portez des vêtements de protection adéquats qui recouvrent tout votre corps.
- Ne pointez pas le chalumeau en direction de votre corps ni de la pièce à couper lorsque vous appuyez sur la gâchette − l'arc pilote s'allume automatiquement.
- Mettez l'alimentation hors tension et débranchez le cordon d'alimentation avant de démonter le chalumeau ou de changer une pièce du chalumeau.
- Utilisez uniquement le ou les chalumeaux recommandés dans le manuel de l'opérateur.



LES BOUTEILLES peuvent exploser si elles sont endommagées.

Les bouteilles de gaz contiennent du gaz sous haute pression. Si une bouteille est endommagée, elle peut exploser. Puisque les bouteilles de gaz font habituellement partie d'un processus de travail des métaux, assurez−vous de les manipuler correctement.

- Protégez les bouteilles de gaz comprimé contre la chaleur excessive, les chocs mécaniques, des dommages physiques, le laitier, la flamme, les étincelles et l'arc.
- Installez et attachez les bouteilles dans la position verticale à l'aide d'une chaîne, sur un support stationnaire ou un châssis porte−bouteille afin de prévenir qu'elles ne tombent ou ne basculent.
- Les bouteilles ne doivent pas être près de la zone de coupage ni de tout autre circuit électrique.
- Un contact électrique ne doit jamais se produire entre un chalumeau de plasma d'arc et une bouteille.
- Ne coupez jamais sur une bouteille pressurisée − une explosion en résulterait.
- Utilisez uniquement des bouteilles de gaz, des détendeurs, des boyaux et des raccords conçus pour l'application déterminée. Gardez−les, ainsi que toute autre pièce associée, en bonne condition.
- Détournez votre visage du détendeur−régulateur lorsque vous ouvrez la soupape de la bouteille.
- Le couvercle du détendeur doit toujours être en place, sauf lorsque vous utilisez la bouteille ou qu'elle est reliée pour usage ultérieur.
- Utiliser les équipements corrects, les bonnes procédures et suffisamment de personnes pour soulever et déplacer les bouteilles.
- Lire et suivre les instructions sur les bouteilles de gaz comprimé, l'équipement connexe et le dépliant P-1 de la CGA (Compressed Gas Association) mentionné dans les principales normes de sécurité.

2-3. Dangers supplémentaires en relation avec l'installation, le fonctionnement et la maintenance



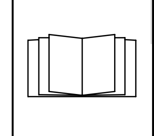
LES PIÈCES CHAUDES peuvent provoquer des brûlures.

- Ne pas toucher des parties chaudes à mains nues.
- Prévoir une période de refroidissement avant d'utiliser l'équipement.
- Ne pas toucher aux pièces chaudes, utiliser les outils recommandés et porter des gants de soudage et des vêtements épais pour éviter les brûlures.



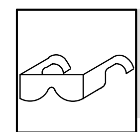
Les PIÈCES MOBILES peuvent provoquer des blessures.

- S'abstenir de toucher des organes mobiles tels que des ventilateurs.
- Maintenir fermés et verrouillés les portes, panneaux, recouvrements et dispositifs de protection.
- Lorsque cela est nécessaire pour des travaux d'entretien et de dépannage, faire retirer les portes, panneaux, recouvrements ou dispositifs de protection uniquement par du personnel qualifié.
- Remettre les portes, panneaux, recouvrements ou dispositifs de protection quand l'entretien est terminé et avant de rebrancher l'alimentation électrique.



LIRE LES INSTRUCTIONS.

- Lire et appliquer les instructions sur les étiquettes et le Mode d'emploi avant l'installation, l'utilisation ou l'entretien de l'appareil. Lire les informations de sécurité au début du manuel et dans chaque section.
- N'utiliser que les pièces de rechange recommandées par le constructeur.
- Effectuer l'entretien en respectant les manuels d'utilisation, les normes industrielles et les codes nationaux, d'état et locaux.



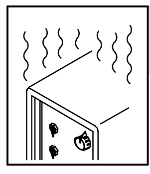
DES PIECES DE METAL ou DES SALETES peuvent provoquer des blessures dans les yeux.

- Porter des lunettes de sécurité avec écrans latéraux ou un écran facial.



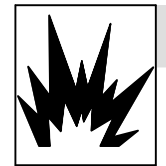
Les CHAMPS ÉLECTROMAGNÉTIQUES (CEM) peuvent affecter les implants médicaux.

- Les porteurs de stimulateurs cardiaques et autres implants médicaux doivent rester à distance.
- Les porteurs d'implants médicaux doivent consulter leur médecin et le fabricant du dispositif avant de s'approcher de la zone où se déroule du soudage à l'arc, du soudage par points, du gougeage, de la découpe plasma ou une opération de chauffage par induction.



L'EMPLOI EXCESSIF peut SURCHAUFFER L'ÉQUIPEMENT.

- Prévoir une période de refroidissement; respecter le cycle opératoire nominal.
- Réduire l'ampérage (épaisseur) avant de continuer à couper ou réduire le facteur de marche.



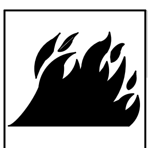
Danger D'EXPLOSION D'HYDROGÈNE.

- Lors du coupage d'aluminium partiellement ou totalement immergé dans l'eau, de l'hydrogène libre peut s'accumuler sous la pièce.
- Consultez votre ingénieur de coupage et les instructions de la table de coupage.



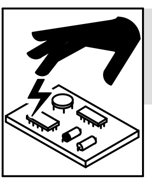
LA CHUTE DE L'ÉQUIPEMENT peut provoquer des blessures.

- Utiliser l'anneau de levage uniquement pour soulever l'appareil, NON PAS les chariot, les bouteilles de gaz ou tout autre accessoire.
- Utiliser un engin d'une capacité appropriée pour soulever l'appareil.
- En utilisant des fourches de levage pour déplacer l'unité, s'assurer que les fourches sont suffisamment longues pour dépasser du côté opposé de l'appareil.
- Tenir l'équipement (câbles et cordons) à distance des véhicules mobiles lors de toute opération en hauteur.
- Suivre les consignes du Manuel des applications pour l'équation de levage NIOSH révisée (Publication Nº94–110) lors du levage manuelle de pièces ou équipements lourds.



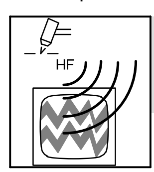
Risque D'INCENDIE OU D'EXPLOSION.

- Ne pas placer l'appareil sur, au-dessus ou à proximité de surfaces infllammables.
- Ne pas installer l'appareil à proximité de produits inflammables
- Ne pas surcharger l'installation électrique – s'assurer que l'alimentation est correctement dimensionné et protégé avant de mettre l'appareil en service.



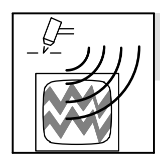
LES CHARGES ÉLECTROSTATIQUES peuvent endommager les circuits imprimés.

- Etablir la connexion avec la barrette de terre avant de manipuler des cartes ou des pièces.
- Utiliser des pochettes et des boîtes antistatiques pour stocker, déplacer ou expédier des cartes PC.



LE RAYONNEMENT HAUTE FRÉQUENCE (H.F.) risque de provoquer des interférences.

- Le Rayonnement haute frequence (H.F.) peut provoquer des interférences avec les équipements de radio−navigation et de communication, les services de sécurité et les ordinateurs.
- Demander seulement à des personnes qualifiées familiarisées avec des équipements électroniques de faire fonctionner l'installation.
- L'utilisateur est tenu de faire corriger rapidement par un électricien qualifié les interférences résultant de l'installation.
- Si le FCC signale des interférences, arrêter immédiatement l'appareil.
- Effectuer régulièrement le contrôle et l'entretien de l'installation.
- Maintenir soigneusement fermés les portes et les panneaux des sources de haute fréquence, maintenir les éclateurs à une distance correcte et utiliser une terre et et un blindage pour réduire les interférences éventuelles.



LE COUPAGE Ã L'ARC peut causer des interférence.

- L'énergie électromagnétique peut gêner le fonctionnement d'appareils électroniques comme des ordinateurs et des robots.
- Pour réduire la possibilité d'interférence, maintenir les câbles aussi courts que possible, les grouper, et les poser aussi bas que possible (ex. par terre).
- Veiller à couper à une distance de 100 mètres de tout équipement électronique sensible.
- S'assurer que la source de coupage est correctement branchée et mise à la terre.
- Si l'interférence persiste, l'utilisateur doit prendre des mesures supplémentaires comme écarter la machine, utiliser des câbles blindés de des filtres, ou boucler la zone de travail.

2-4. Proposition californienne 65 Avertissements



Les équipements de soudage et de coupage produisent des fumées et des gaz qui contiennent des produits chimiques dont l'État de Californie reconnaît qu'ils provoquent des malformations congénitales et, dans certains cas, des cancers. (Code de santé et de sécurité de Californie, chapitre 25249.5 et suivants)



Ce produit contient des produits chimiques, compris du plomb, dont l'État de Californie reconnaît qu'ils provoquent des cancers et des malformations congénitales ou autres problèmes de procréation. *Se laver les mains après manipulation.*



Ce produit contient des éléments chimiques, dont le plomb, reconnus par l'État de Californie pour leur caractère cancérogène ainsi que provoquant des malformations congénitales ou autres problèmes de procréation. *Se laver les mains après toute manipulation.*

Pour les moteurs à essence :



Les gaz d'échappement des moteurs contiennent des produits chimiques dont l'État de Californie reconnaît qu'ils provoquent des cancers et des malformations congénitales ou autres problèmes de procréation.

Pour les moteurs diesel :



Les gaz d'échappement des moteurs diesel et certains de leurs composants sont reconnus par l'État de Californie comme provoquant des cancers et des malformations congénitales ou autres problèmes de procréation.

2-5. Principales normes de sécurité

Safety in Welding, Cutting, and Allied Processes, ANSI Standard Z49.1, de Global Engineering Documents (téléphone : 1-877-413-5184, site Internet : www.global.ihs.com).

Recommended Practices for Plasma Arc Cutting and Gouging, American Welding Society Standard AWS C5.2, de Global Engineering Documents (téléphone : 1-877-413-5184, site internet : www.global.ihs.com).

Safe Practices for the Preparation of Containers and Piping for Welding and Cutting, American Welding Society Standard AWS F4.1, de Global Engineering Documents (téléphone: 1-877-413-5184, site internet : www.global.ihs.com).

National Electrical Code, NFPA Standard 70, de National Fire Protection Association, Quincy, MA 02269 (téléphone : 1-800-344-3555, site Internet : www.nfpa.org et www.sparky.org).

Safe Handling of Compressed Gases in Cylinders, CGA Pamphlet P-1, de Compressed Gas Association, 4221 Walney Road, 5th Floor, Chantilly, VA 20151 (téléphone : 703-788-2700, site Internet : www.cganet.com).

Safety in Welding, Cutting, and Allied Processes, CSA Standard W117.2, de Canadian Standards Association, Standards Sales, 5060 Spectrum Way, Suite 100, Ontario, Canada L4W 5NS (téléphone : 800-463-6727, site internet : www.csa-international.org).

Safe Practice For Occupational And Educational Eye And Face Protection, ANSI Standard Z87.1, de American National Standards Institute, 25 West 43rd Street, New York, NY 10036 (téléphone : 212-642-4900, site Internet : www.ansi.org).

Standard for Fire Prevention During Welding, Cutting, and Other Hot Work, NFPA Standard 51B, de National Fire Protection Association, Quincy, MA 02269 (téléphone : 1-800-344-3555, site Internet : www.nfpa.org).

OSHA, Occupational Safety and Health Standards for General Industry, Title 29, Code of Federal Regulations (CFR), Part 1910, Subpart Q, and Part 1926, Subpart J, de U.S. Government Printing Office, Superintendent of Documents, P.O. Box 371954, Pittsburgh, PA 15250-7954 (téléphone : 1-866-512-1800) (il y a 10 bureaux régionaux –le téléphone de la région 5, Chicago, est 312-353-2220, site Internet : www.osha.gov).

Applications Manual for the Revised NIOSH Lifting Equation, The National Institute for Occupational Safety and Health (NIOSH), 1600 Clifton Rd, Atlanta, GA 30333
(téléphone: 1-800-232-4636, site internet : www.cdc.gov/NIOSH).

2-6. Informations relatives aux CEM

Le courant électrique qui traverse tout conducteur génère des champs électromagnétiques (CEM) à certains endroits. Le courant de soudage crée un CEM autour du circuit et du matériel de soudage. Les CEM peuvent créer des interférences avec certains implants médicaux comme des stimulateurs cardiaques. Des mesures de protection pour les porteurs d'implants médicaux doivent être prises: par exemple, des restrictions d'accès pour les passants ou une évaluation individuelle des risques pour les soudeurs. Tous les soudeurs doivent appliquer les procédures suivantes pour minimiser l'exposition aux CEM provenant du circuit de soudage:

1. Rassembler les câbles en les torsadant ou en les attachant avec du ruban adhésif ou avec une housse.
2. Ne pas se tenir au milieu des câbles de soudage. Disposer les câbles d'un côté et à distance de l'opérateur.
3. Ne pas courber et ne pas entourer les câbles autour de votre corps.
4. Maintenir la tête et le torse aussi loin que possible du matériel du circuit de soudage.
5. Connecter la pince sur la pièce aussi près que possible de la soudure.
6. Ne pas travailler à proximité d'une source de soudage, ni s'asseoir ou se pencher dessus.
7. Ne pas souder tout en portant la source de soudage ou le dévidoir.

En ce qui concerne les implants médicaux :

Les porteurs d'implants doivent d'abord consulter leur médecin avant de s'approcher des opérations de soudage à l'arc, de soudage par points, de gougeage, du coupage plasma ou de chauffage par induction. Si le médecin approuve, il est recommandé de suivre les procédures précédentes.

SECTION 3 – DEFINITIONS

3-1. Symbols And Definitions For Nameplate And Serial Number/Rating Label

A	Amperes		Plasma Arc Cutting (PAC)		Adjust Air/Gas Pressure		Low Air Pressure Light
V	Volts		Increase		No – Do Not Do This		Temperature
	Protective Earth (Ground)	1~	Single Phase		Constant Current	V	Voltage Input
I	On	O	Off	%	Percent		Direct Current
U_0	Rated No Load Voltage (Average)	U_1	Primary Voltage	U_2	Conventional Load Voltage		Line Connection
I_{1max}	Rated Maximum Supply Current	I_2	Rated Welding Current	X	Duty Cycle		Single Phase Or Three Phase Static Frequency Converter-Transformer-Rectifier
IP	Degree Of Protection		Loose Shield Cup		Input	Hz	Hertz
I_{1eff}	Maximum Effective Supply Current	pf	power factor	S	Suitable for Some Hazardous Locations	S_1	Power Rating, Product Of Voltage And Current (KVA)

SECTION 4 – INSTALLATION

4-1. Specifications

☞ *For any single or three phase voltage from 208 V to 575 V, the Amperes Input at Rated Load Output is the same for 50 Hertz or 60 Hertz input power. For example, the amperes input for 230 V, 50 Hz, single-phase input power is 33 amperes. The amperes input for 230 V, 60 Hz, single-phase input power is also 33 amperes.*

60 Hz	**Amperes Input at Rated Load Output 60 Hz**						**Rated Output**	**Type of Output**	**Plasma Gas**	**Rated Cutting Capacity**	**Maximum Open-Circuit Voltage DC**
	208 V	**230 V**	**460 V**	**575 V**	**KVA**	**KW**					
Single-Phase	36	33	16	13	7.5	7.4	55 A @ 110 Volts DC, 50% Duty Cycle	Direct Current, Straight Polarity (DCEN)	6.0 CFM (172 L/min) At 70 PSI (483 kPa) Air Or Nitrogen Only	0.875 in. (22 mm) At 10 IPM	280
3-Phase	21	20	9	8	7.6 (7.9 for 575 V input)	7.4	55 A @ 110 Volts DC, 60% Duty Cycle				

50 Hz	**Amperes Input at Rated Load Output 50 Hz**						**Rated Output**	**Type of Output**	**Plasma Gas**	**Rated Cutting Capacity**	**Maximum Open-Circuit Voltage DC**
	230 V	**380 V**	**400 V**	**415 V**	**KVA**	**KW**					
Single-Phase	33	– –	– –	– –	7.6	7.4	55 A @ 110 Volts DC, 50% Duty Cycle	Direct Current, Straight Polarity (DCEN)	6.0 CFM (172 L/min) At 70 PSI (483 kPa) Air Or Nitrogen Only	0.875 in. (22 mm) At 10 IPM	280
3-Phase	20	10	10	10	7.6	7.4	55 A @ 110 Volts DC, 60% Duty Cycle				

4-2. Duty Cycle and Overheating

Duty Cycle is percentage of 10 minutes that unit can cut at rated load without overheating.

If unit overheats, thermostat(s) opens, output stops, and cooling fan runs. Wait fifteen minutes for unit to cool. Reduce amperage or duty cycle before cutting.

NOTICE *– Exceeding duty cycle can damage unit and void warranty.*

Three-Phase Input Power:
60% Duty Cycle

6 Minutes Cutting

4 Minutes Resting

Single-Phase Input Power:
50% Duty Cycle

5 Minutes Cutting

5 Minutes Resting

Overheating

0

15

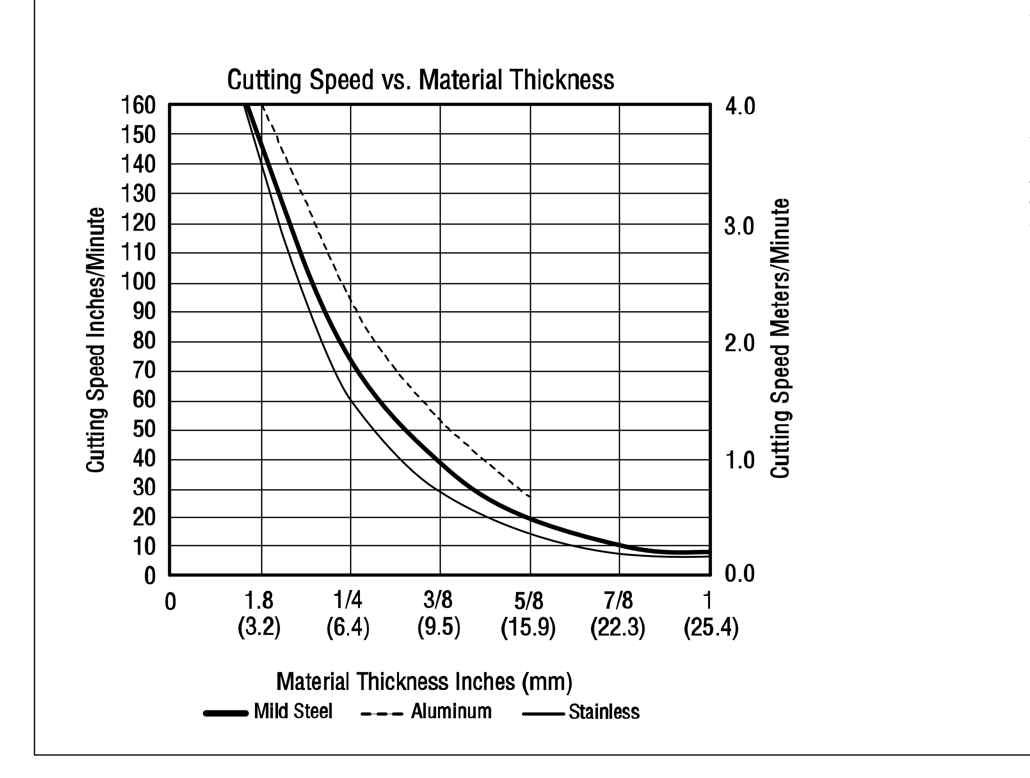
Minutes

A

OR
Reduce Duty Cycle

duty1 4/95

4-3. Cutting Speed



The cutting speed curve shows the recommended maximum cutting speed capabilities of the power source and torch for mild steel, aluminum and stainless steel of various thickness.

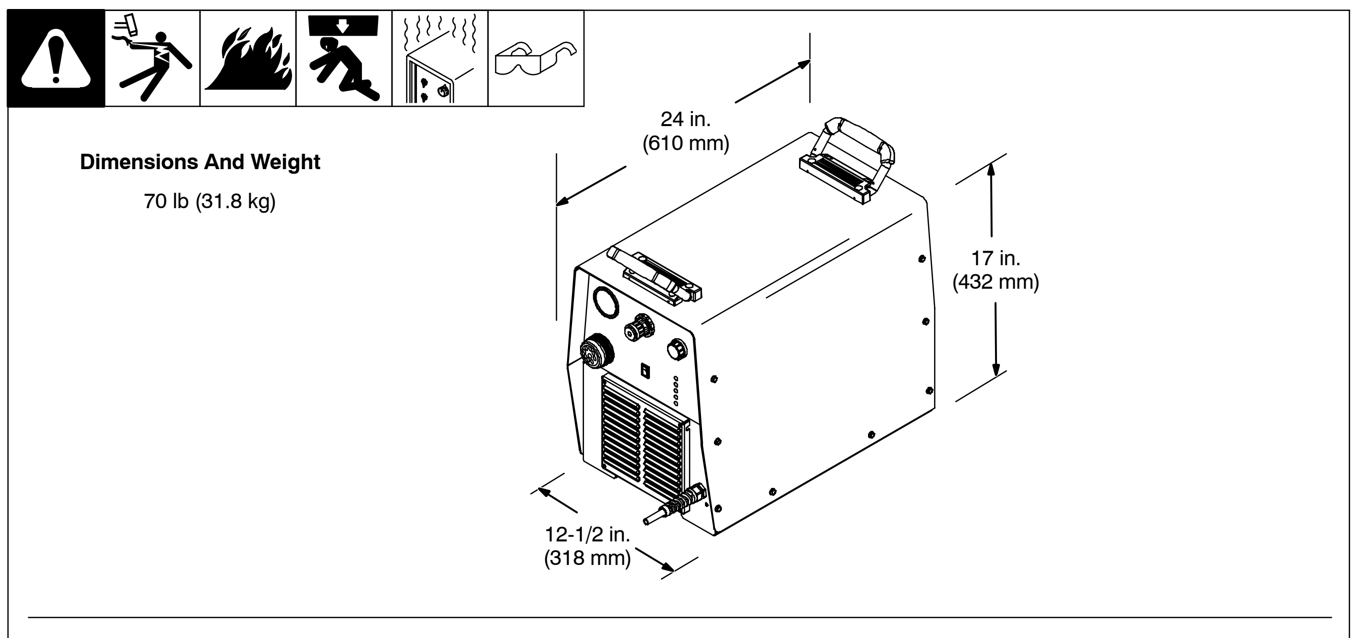
NOTICE *– Exceeding recommended cutting speeds will cause rapid erosion of the tip and electrode.*

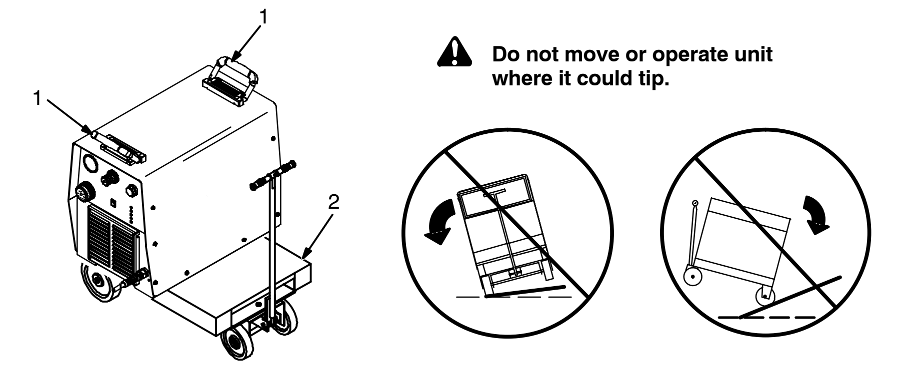
☞ *Cutting speed is approximately 10 inches per minute at 0.875 in. (22 mm) mild steel thickness at max setting/tip saver mode.*

4-4. Serial Number And Rating Label Location

The serial number and rating information for this product is located on the back. Use rating label to determine input power requirements and/or rated output. For future reference, write serial number in space provided on back cover of this manual.

4-5. Selecting a Location





1 Lifting Handles

Use handles to lift unit.

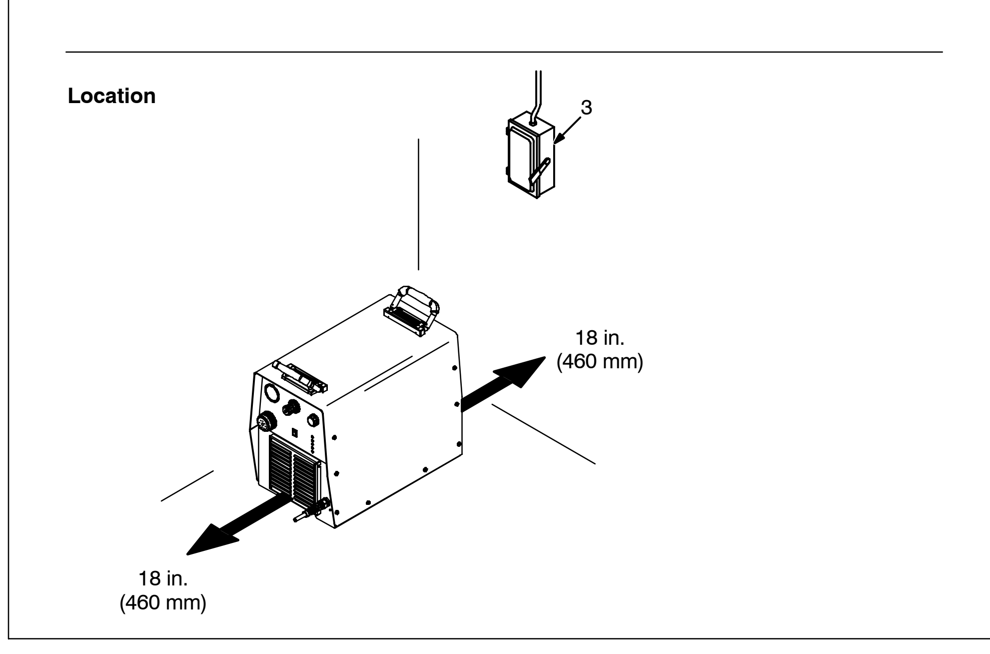
2 Hand Cart

Use cart or similar device to move unit.

3 Line Disconnect Device

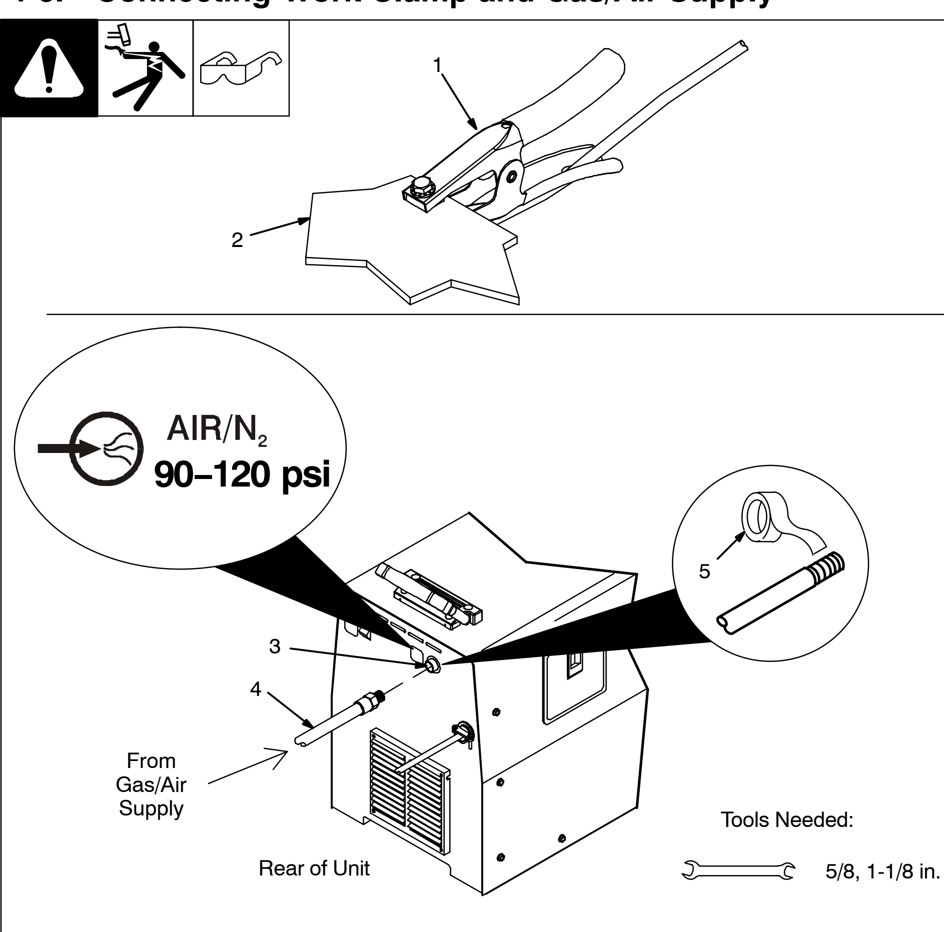
Locate unit near correct input power supply.

Special installation may be required where gasoline or volatile liquids are present – see NEC Article 511 or CEC Section 20.



loc_2 3/96 - Ref. 151 556 / 802 183

4-6. Connecting Work Clamp and Gas/Air Supply



1 Work Clamp
2 Workpiece

Connect work clamp to a clean, paint-free location on workpiece, as close to cutting area as possible.

☞ *Use only clean, dry air with 90 to 120 psi (620 to 827 kPa) pressure.*

3 Gas/Air Inlet Opening
4 Hose

☞ *Hose must have a minimum inside diameter of 3/8 in. (9.5 mm).*

5 Teflon Tape

Obtain hose with 1/4 NPT right-hand thread fitting. Wrap threads with teflon tape (optional) or apply pipe sealant, and install fitting in opening. Route hose to gas/air supply.

Adjust gas/air pressure according to Section 5-2.

Ref. 803 640-A / Ref. 192 441 / Ref. 802 185-B

4-7. Electrical Service Guide


Failure to follow these electrical service guide recommendations could create an electric shock or fire hazard. These recommendations are for a dedicated branch circuit sized for the rated output and duty cycle of the welding power source.

NOTICE *– Actual input voltage should not be 10% less than minimum and/or 10% more than maximum input voltages listed in table. If actual input voltage is outside this range, output may not be be available.*

☞ *For any single or three phase voltage from 208 V to 575 V, the Amperes Input at Rated Load Output is the same for 50 Hertz or 60 Hertz input power. For example, the amperes input for 230 V, 50 Hz, single-phase input power is 33 amperes. The amperes input for 230 V, 60 Hz, single-phase input power is also 33 amperes.*

60 Hz Models	Single Phase				Three Phase			
Input Voltage (V)	208	230	460	575	208	230	460	575
Input Amperes (A) At Rated Output	36	33	16	13	21	20	9	8
Max Recommended Standard Fuse Rating In Amperes[1]								
Time-Delay Fuses [2]	45	40	20	15	25	20	10	10
Normal Operating Fuses [3]	50	50	25	20	30	30	15	10
Min Input Conductor Size In AWG [4]	10	10	14	14	12	14	14	14
Max Recommended Input Conductor Length In Feet (Meters)	72 (22)	89 (27)	138 (42)	215 (66)	87 (27)	69 (21)	275 (84)	429 (131)
Min Grounding Conductor Size In AWG [4]	10	10	14	14	12	14	14	14

Reference: 2008 National Electrical Code (NEC) (including article 630)

1 If a circuit breaker is used in place of a fuse, choose a circuit breaker with time-current curves comparable to the recommended fuse.

2 “Time-Delay” fuses are UL class “RK5” . See UL 248.

3 “Normal Operating” (general purpose - no intentional delay) fuses are UL class “K5” (up to and including 60 amps), and UL class “H” (65 amps and above).

4 Conductor data in this section specifies conductor size (excluding flexible cord or cable) between the panelboard and the equipment per NEC Table 310.16. If a flexible cord or cable is used, minimum conductor size may increase. See NEC Table 400.5(A) for flexible cord and cable requirements.

Failure to follow these electrical service guide recommendations could create an electric shock or fire hazard. These recommendations are for a dedicated branch circuit sized for the rated output and duty cycle of the welding power source.

50 Hz Models	Single Phase	Three Phase			
Input Voltage (V)	230	230	380	400	415
Input Amperes (A) At Rated Output	33	20	10	10	10
Max Recommended Standard Fuse Rating In Amperes[1]					
Time-Delay Fuses[2]	40	20	10	10	10
Normal Operating Fuses[3]	50	30	15	15	15
Min Input Conductor Size In AWG[4]	10	14	14	14	14
Max Recommended Input Conductor Length In Feet (Meters)	88 (27)	69 (21)	188 (57)	208 (63)	224 (68)
Min Grounding Conductor Size In AWG[4]	10	14	14	14	14

Reference: 2008 National Electrical Code (NEC) (including article 630)

1 If a circuit breaker is used in place of a fuse, choose a circuit breaker with time-current curves comparable to the recommended fuse.

2 "Time-Delay" fuses are UL class "RK5" . See UL 248.

3 "Normal Operating" (general purpose - no intentional delay) fuses are UL class "K5" (up to and including 60 amps), and UL class "H" (65 amps and above).

4 Conductor data in this section specifies conductor size (excluding flexible cord or cable) between the panelboard and the equipment per NEC Table 310.16. If a flexible cord or cable is used, minimum conductor size may increase. See NEC Table 400.5(A) for flexible cord and cable requirements.

4-8. Extension Cord Data

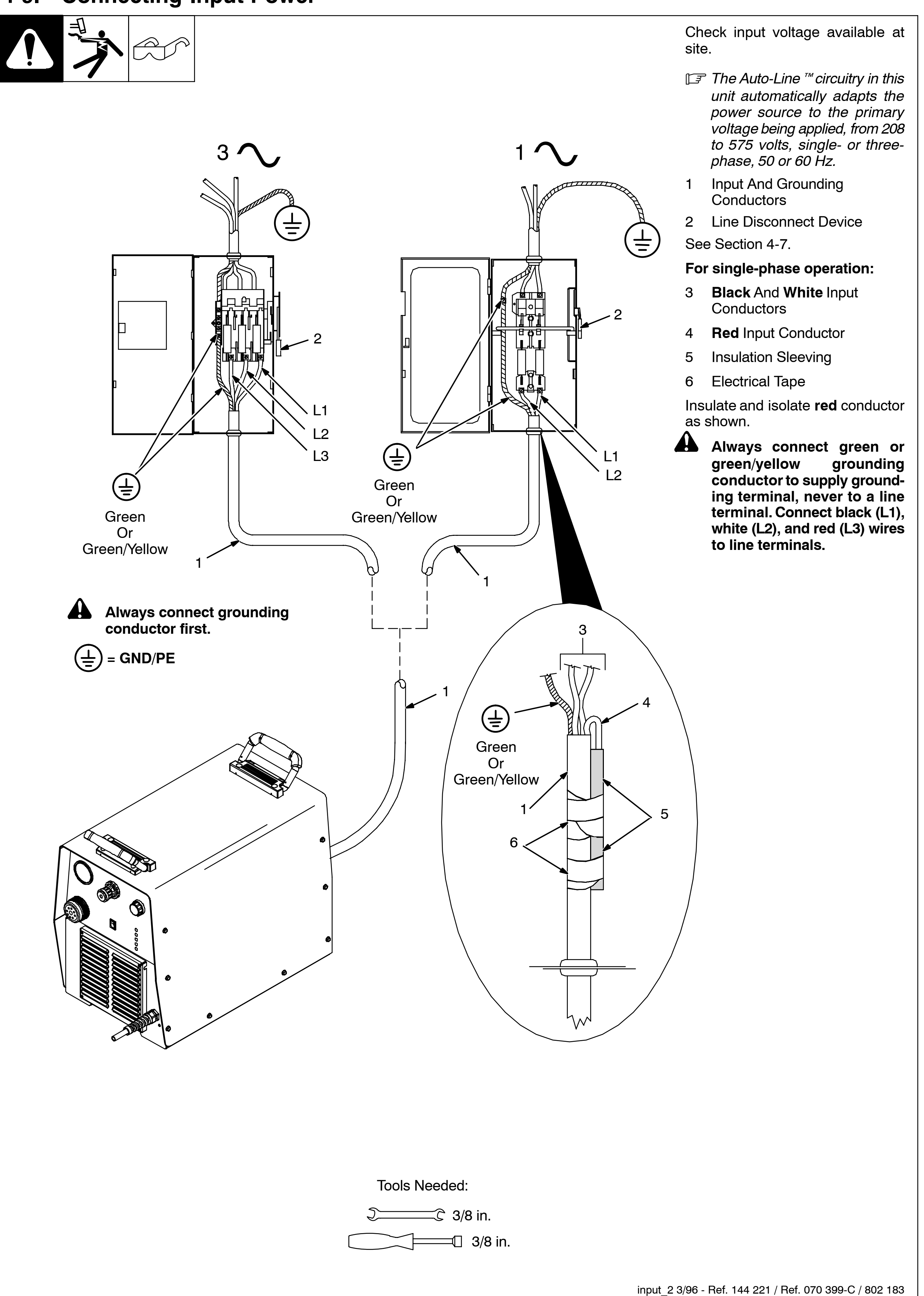
☞ *When calculating max. cord length, remember to include conductor length from line disconnect device to input power receptacle.*

Input Voltage	Input Power Phase	Hertz	Fuse Size Or Circuit Breaker Rating	Conductor Size	Max. Cord Length
208 V	1	60	**Time-Delay**[2] 45 A **Normal Operating**[3] 50 A	10 AWG	72 ft (22 m)
230 V	1	60	**Time-Delay**[2] 40 A **Normal Operating**[3] 50 A	10 AWG	89 ft (27 m)
460 V	1	60	**Time-Delay**[2] 20 A **Normal Operating**[3] 25 A	14 AWG	138 ft (42 m)
575 V	1	60	**Time-Delay**[2] 15 A **Normal Operating**[3] 20 A	14 AWG	215 ft (66 m)
208 V	3	60	**Time-Delay**[2] 25 A **Normal Operating**[3] 30 A	14 AWG	87 ft (27 m)
230 V	3	60	**Time-Delay**[2] 20 A **Normal Operating**[3] 30 A	14 AWG	69 ft (21 m)
460 V	3	60	**Time-Delay**[2] 10 A **Normal Operating**[3] 15 A	14 AWG	275 ft (84 m)
575 V	3	60	**Time-Delay**[2] 10 A **Normal Operating**[3] 10 A	14 AWG	429 ft (131 m)
230 V	1	50	**Time-Delay**[2] 40 A **Normal Operating**[3] 50 A	10 AWG	88 ft (27 m)
230 V	3	50	**Time-Delay**[2] 20 A **Normal Operating**[3] 30 A	14 AWG	69 ft (21 m)
380 V	3	50	**Time-Delay**[2] 10 A **Normal Operating**[3] 15 A	14 AWG	188 ft (57 m)
400 V	3	50	**Time-Delay**[2] 10 A **Normal Operating**[3] 15 A	14 AWG	208 ft (63 m)
415 V	3	50	**Time-Delay**[2] 10 A **Normal Operating**[3] 15 A	14 AWG	224 ft (68 m)

2 "Time-Delay" fuses are UL class "RK5" .

3 "Normal Operating" (general purpose – no intentional delay) fuses are UL class "K5" (up to and including 60 amp), and UL class "H" (65 amp and above).

4-9. Connecting Input Power



Check input voltage available at site.

☞ *The Auto-Line ™ circuitry in this unit automatically adapts the power source to the primary voltage being applied, from 208 to 575 volts, single- or three-phase, 50 or 60 Hz.*

1 Input And Grounding Conductors

2 Line Disconnect Device

See Section 4-7.

For single-phase operation:

3 **Black** And **White** Input Conductors

4 **Red** Input Conductor

5 Insulation Sleeving

6 Electrical Tape

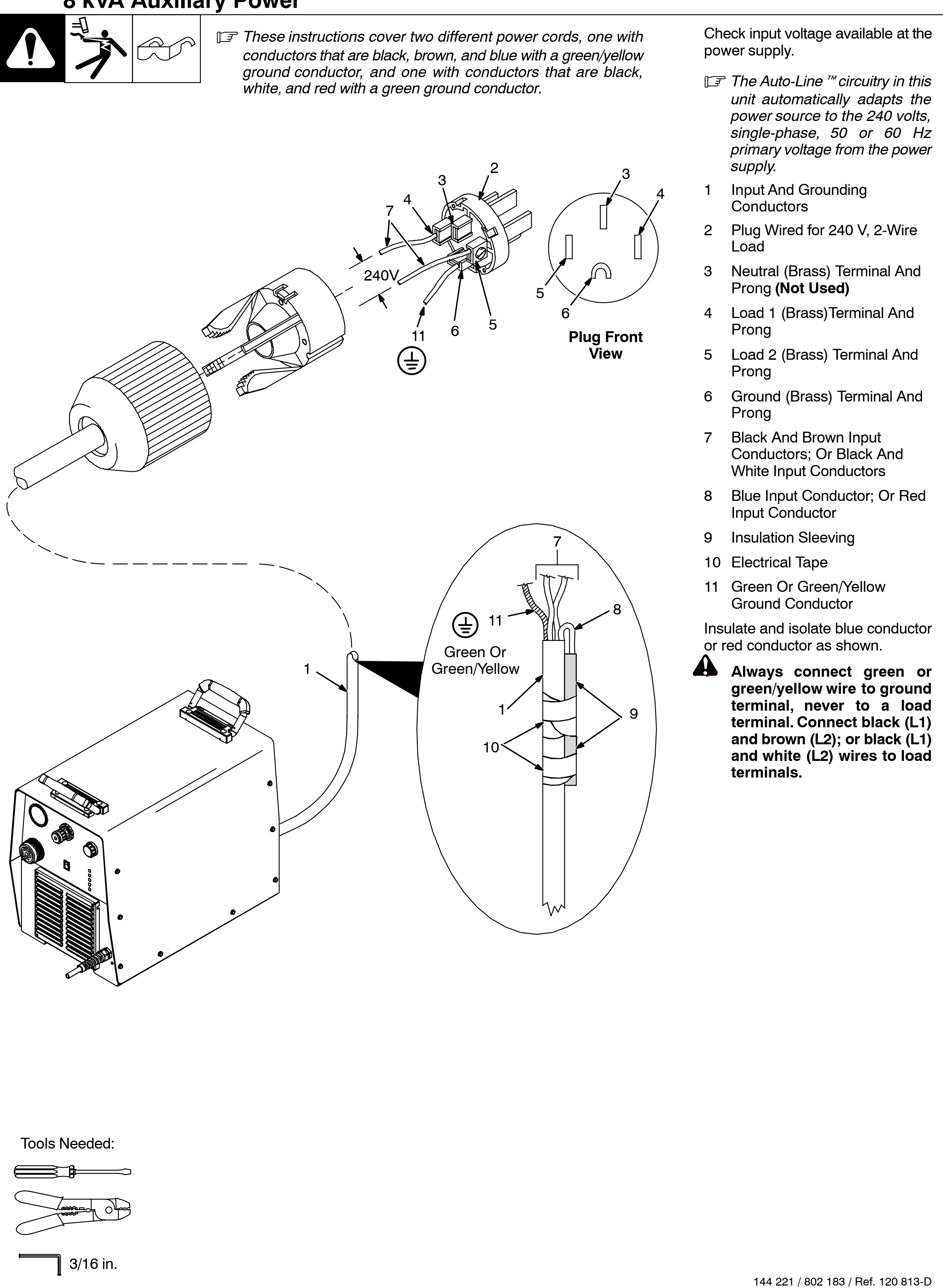
Insulate and isolate **red** conductor as shown.

⚠ **Always connect green or green/yellow grounding conductor to supply grounding terminal, never to a line terminal. Connect black (L1), white (L2), and red (L3) wires to line terminals.**

input_2 3/96 - Ref. 144 221 / Ref. 070 399-C / 802 183

4-10. Wiring Optional 240 Volt Plug (119 172) For Connection To Miller Bobcat Or Trailblazer 251NT, 280NT, 300D NT, 301G, DC And 301D With A Minimum Of 8 kVA Auxiliary Power

☞ These instructions cover two different power cords, one with conductors that are black, brown, and blue with a green/yellow ground conductor, and one with conductors that are black, white, and red with a green ground conductor.



Check input voltage available at the power supply.

☞ The Auto-Line ™ circuitry in this unit automatically adapts the power source to the 240 volts, single-phase, 50 or 60 Hz primary voltage from the power supply.

1 Input And Grounding Conductors

2 Plug Wired for 240 V, 2-Wire Load

3 Neutral (Brass) Terminal And Prong **(Not Used)**

4 Load 1 (Brass)Terminal And Prong

5 Load 2 (Brass) Terminal And Prong

6 Ground (Brass) Terminal And Prong

7 Black And Brown Input Conductors; Or Black And White Input Conductors

8 Blue Input Conductor; Or Red Input Conductor

9 Insulation Sleeving

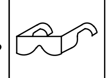
10 Electrical Tape

11 Green Or Green/Yellow Ground Conductor

Insulate and isolate blue conductor or red conductor as shown.

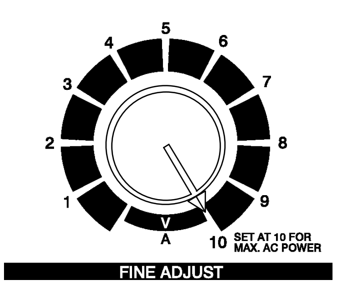
Always connect green or green/yellow wire to ground terminal, never to a load terminal. Connect black (L1) and brown (L2); or black (L1) and white (L2) wires to load terminals.

4-10. Wiring Optional 240 Volt Plug (119 172) For Connection To Miller Bobcat Or Trailblazer 251NT, 280NT, 300D NT, 301G, DC And 301D With A Minimum Of 8 kVA Auxiliary Power (Continued)

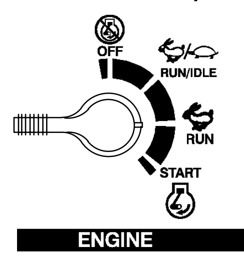
  

 *This plasma cutting unit is not recommended for connection to a Hobart Champion 10,000.*

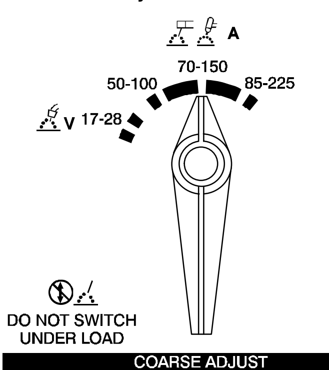
Set generator Fine Adjustment Control to 10 for maximum auxiliary power.



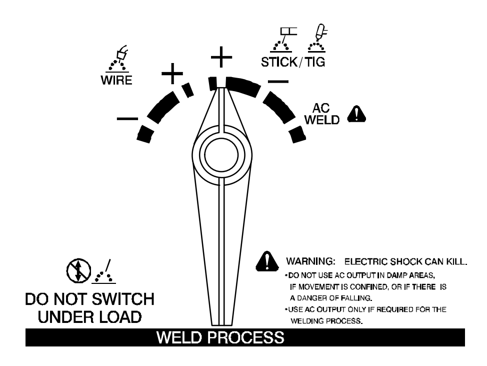
DO NOT let generator go to idle speed; otherwise, serious damage can result to power source. Engine Control Switch must be set at "RUN" position – not "RUN/IDLE".



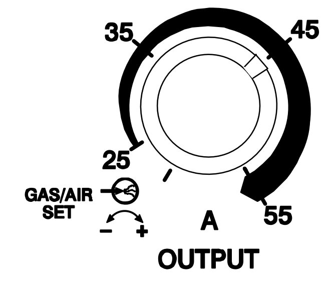
Coarse adjust control has no effect.



Weld Process control has no effect.



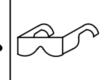
Set Output A amperage adjustment control to 45 amperes or lower to reduce load on welding generator and to prevent arc outages. This recommended amperage setting applies when connecting the plasma cutting unit to welding generators that have an auxiliary power output rating between 8-10 kVA.



Ref. 196 174-A / Ref. 192 444-A

4-10. Wiring Optional 240 Volt Plug (119 172) For Connection To Miller Bobcat Or Trailblazer 251NT, 280NT, 300D NT, 301G, DC And 301D With A Minimum Of 8 kVA Auxiliary Power (Continued)



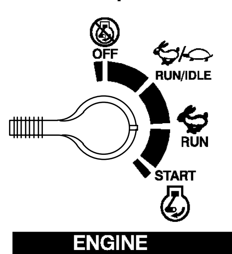


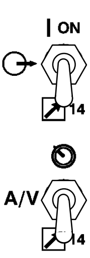
☞ *This plasma cutting unit is not recommended for connection to a Hobart Champion 10,000.*

Trailblazer 251NT, 280NT And 301D NT



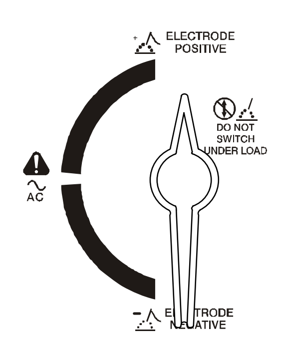
DO NOT let generator go to idle speed; otherwise, serious damage can result to power source. Engine Control Switch must be set at "RUN" position – not "RUN/IDLE".



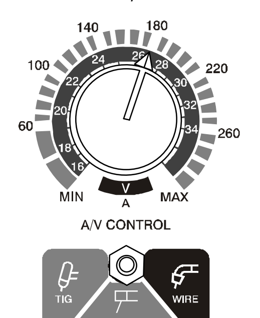


Set Remote Control switches to Remote 14 position

DC Polarity/AC switch has no effect.

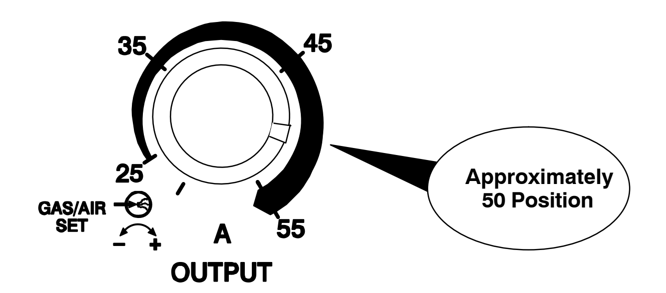


Weld Process and A/V control has no effect.



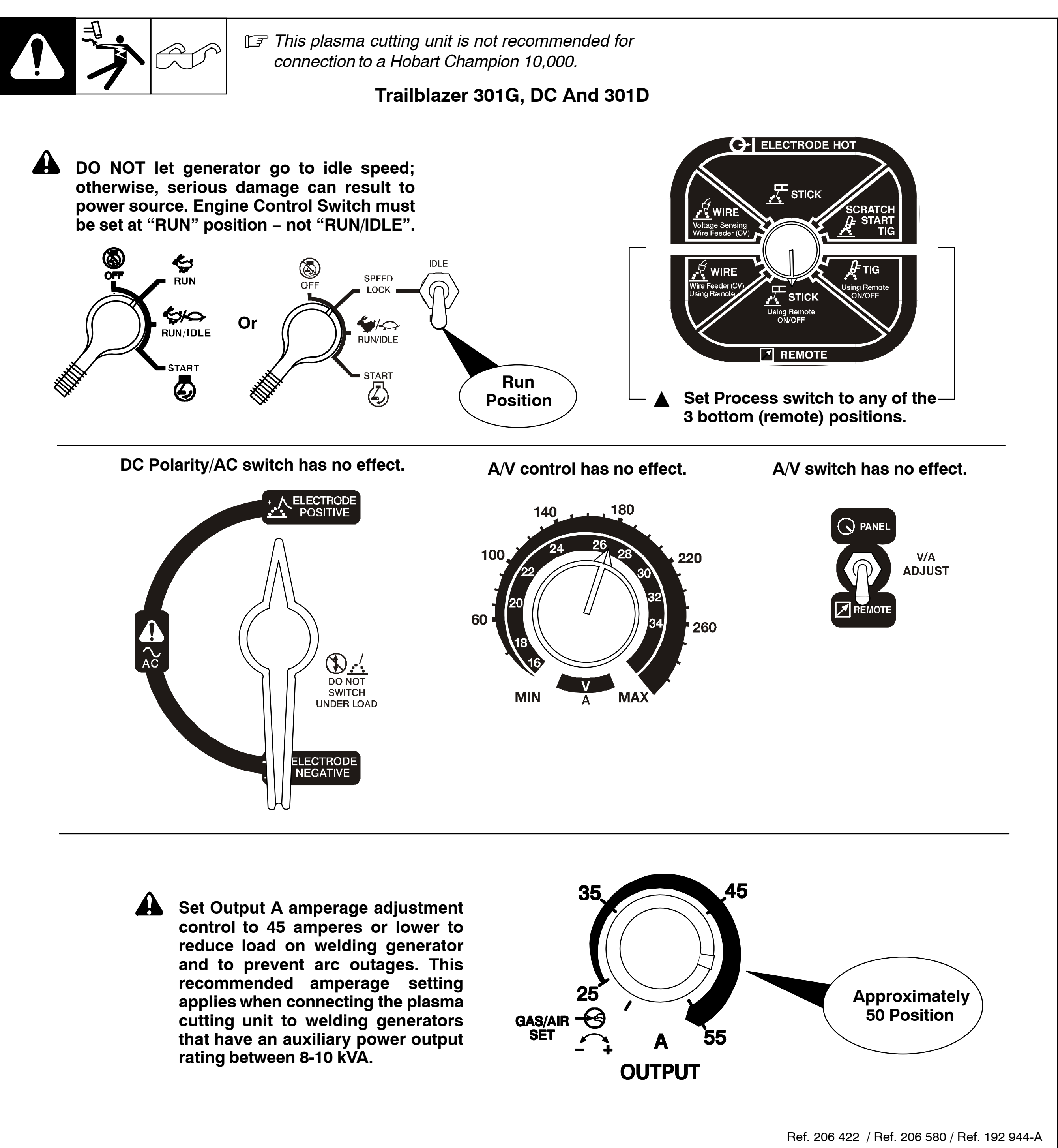


Set Output A amperage adjustment control to 50 amperes or lower to reduce load on welding generator and to prevent arc outages. This recommended amperage setting applies when connecting the plasma cutting unit to welding generators that have an auxiliary power output rating between 8-10 kVA.



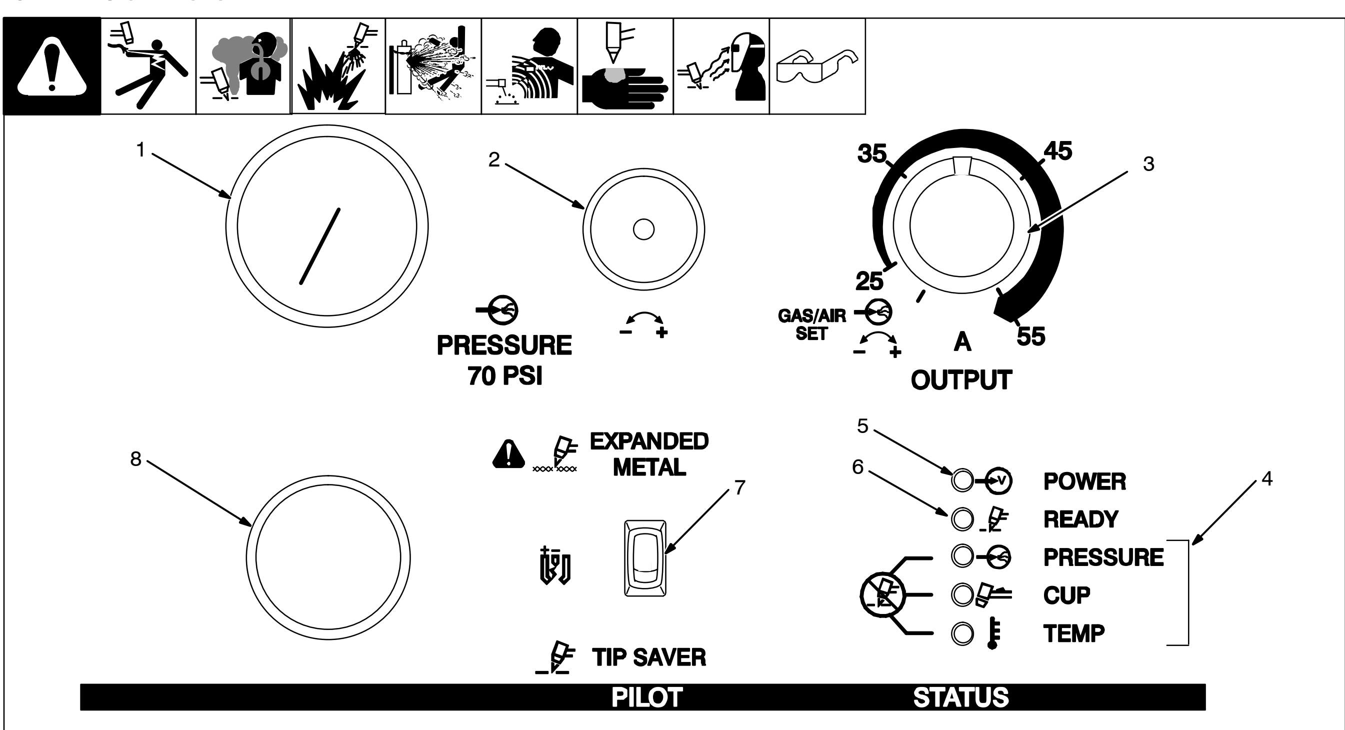
Ref. 203 084 / Ref. 192 944-A

4-10. Wiring Optional 240 Volt Plug (119 172) For Connection To Miller Bobcat Or Trailblazer 251NT, 280NT, 300D NT, 301G, DC And 301D With A Minimum Of 8 kVA Auxiliary Power (Continued)

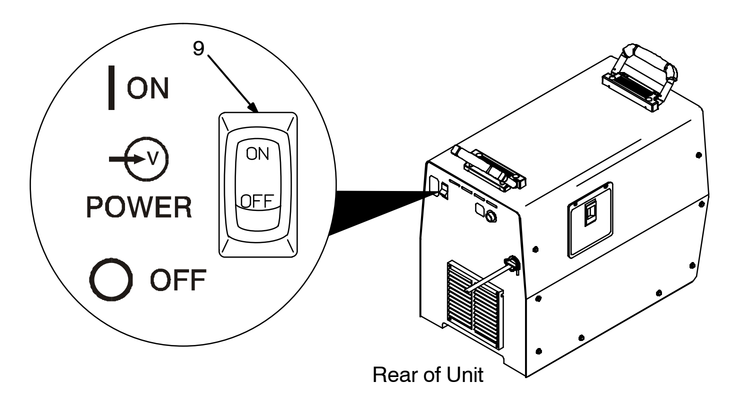


SECTION 5 – OPERATION

5-1. Controls



Ref. 196 174-A / 802 185-B



Rear of Unit

1 Gas/Air Pressure Gauge

2 Gas/Air Pressure Control

3 Output Control

Use control to select cutting output in amperes. Gas/air automatically flows at the set pressure.

Use Gas/Air Set area of control range for setting gas/air pressure (see Section 5-2).

4 Trouble Lights (see Section 6-2)

5 Power Light

6 Ready Light

Ready light comes On when unit is On to indicate that all safety shutdown systems are okay. If Ready light does not come On, check trouble lights.

7 Pilot Arc Switch

Use switch to control pilot arc.

Place switch in Expanded Metal position for continuous pilot arc. Use while cutting expanded metals **only**.

☞ *The Expanded Metal position keeps the pilot arc in the circuit at all times. Life of consumables will be significantly reduced while in Expanded Metal mode.*

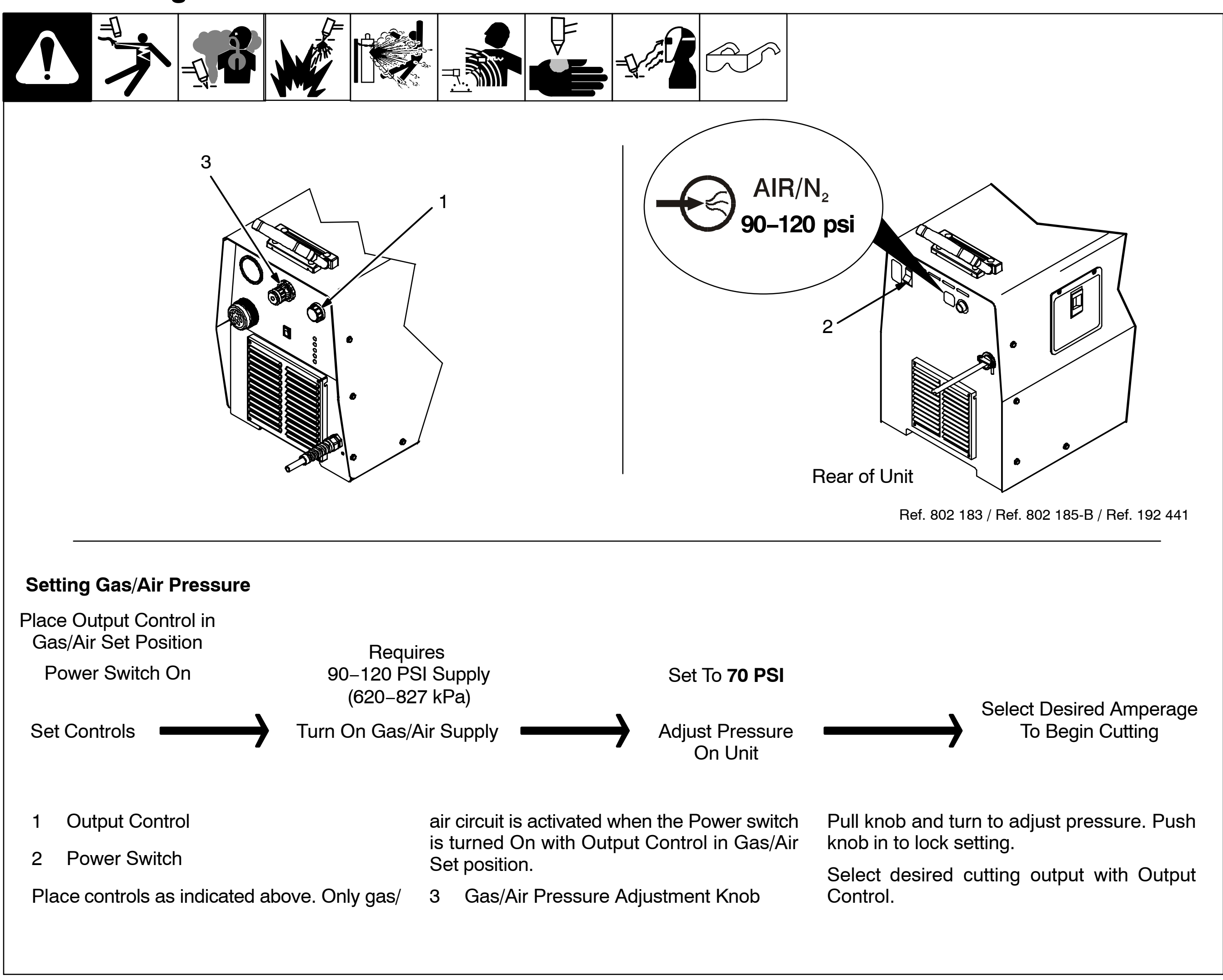
Place switch in Tip Saver position to provide pilot arc output for arc starting only. Use Tip Saver position in most applications to lengthen the life of the torch and its consumables, and to obtain maximum cutting performance.

After the cutting arc goes out, the torch will automatically re-ignite the pilot arc if the trigger is held down.

8 Torch Connection Receptacle

9 Power Switch

5-2. Setting Gas/Air Pressure



Setting Gas/Air Pressure

Set Controls → Turn On Gas/Air Supply → Adjust Pressure On Unit → Select Desired Amperage To Begin Cutting

- Set Controls: Place Output Control in Gas/Air Set Position; Power Switch On
- Turn On Gas/Air Supply: Requires 90−120 PSI Supply (620−827 kPa)
- Adjust Pressure On Unit: Set To **70 PSI**

1 Output Control

2 Power Switch

Place controls as indicated above. Only gas/ air circuit is activated when the Power switch is turned On with Output Control in Gas/Air Set position.

3 Gas/Air Pressure Adjustment Knob

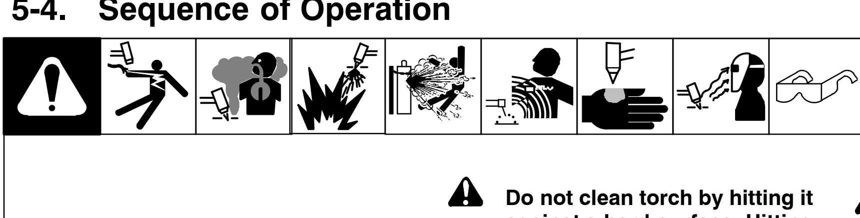
Pull knob and turn to adjust pressure. Push knob in to lock setting.

Select desired cutting output with Output Control.

5-3. Using A Generator To Power The Spectrum 2050

☞ *See Section 4-10 for wiring instructions, and generator and Spectrum 2050 control settings.*

5-4. Sequence of Operation



⚠ **Do not clean torch by hitting it against a hard surface. Hitting hard surfaces can damage torch parts and stop proper operation.**

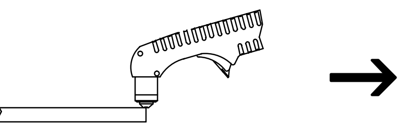
⚠ **Inspect shield cup, tip, and electrode for wear before cutting or whenever cutting speed has been significantly reduced (see torch Owner's Manual). Do not operate torch without a tip or electrode in place.**

Install & Connect Equipment → Put On Personal Safety Equipment → Check Torch Tip, Electrode, And Retaining Cup → Check Gas/Air Pressure → Set Controls → Turn On Power Source → Begin Cutting

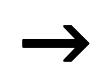
EXAMPLE Of Cutting Operation

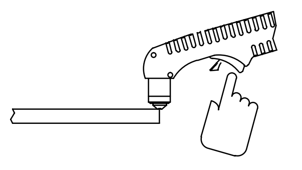


The pilot arc starts immediately when trigger is pressed.

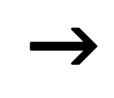


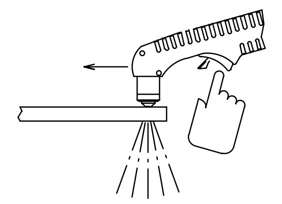
Place drag shield on edge of metal, or allow correct standoff distance – approximately 1/8 in. (3 mm).



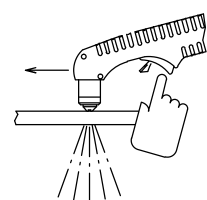


Lift trigger safety lock. Press trigger. Pilot arc starts.

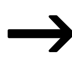


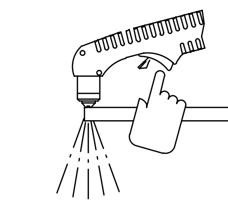


After cutting arc starts, slowly start moving torch across metal.

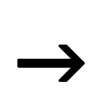


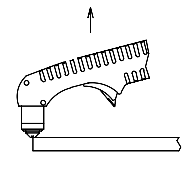
Adjust torch speed so sparks go thru metal and out bottom of cut.





Pause briefly at end of cut before releasing trigger.





Postflow continues for approx. 5 to 15 seconds after releasing trigger; cutting arc can be instantly restarted during postflow by pressing trigger.

801 400-A

SECTION 6 – MAINTENANCE & TROUBLESHOOTING

6-1. Routine Maintenance

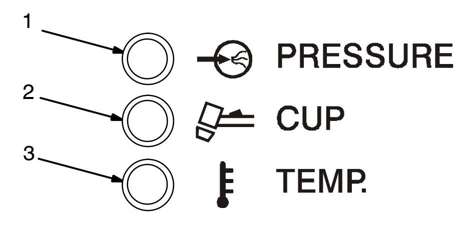
Disconnect power before maintaining.

Maintain more often during severe conditions.

	✓ = Check ◇ = Change ◕ = Clean ☆ = Replace * To be done by Factory Authorized Service Agent				Reference
Each Use	✓ Torch Tip, Electrode, And Shield Cup	✓ Gas/Air Pressure			
Every **Week**	✓ Shield Cup Shutdown System				
Every **3** Months	☆ Unreadable Labels	✓☆ Torch Body, Cable	✓ Tape Torn Outer Covering	✓☆ Cracked Parts	
	✓ Gas/Air Hose				
Every **6** Months	OR ◕ Inside Unit				

6-2. Trouble Lights

☞ *Difficulty establishing pilot arc may indicate consumables need to be cleaned or replaced.*



1 Pressure Light

Lights if gas/air pressure is below 40 PSI (276 kPa).

Turn power Off, and check for proper gas/air pressure (see Section 5-2).

2 Cup Light

Lights if shield cup is loose.

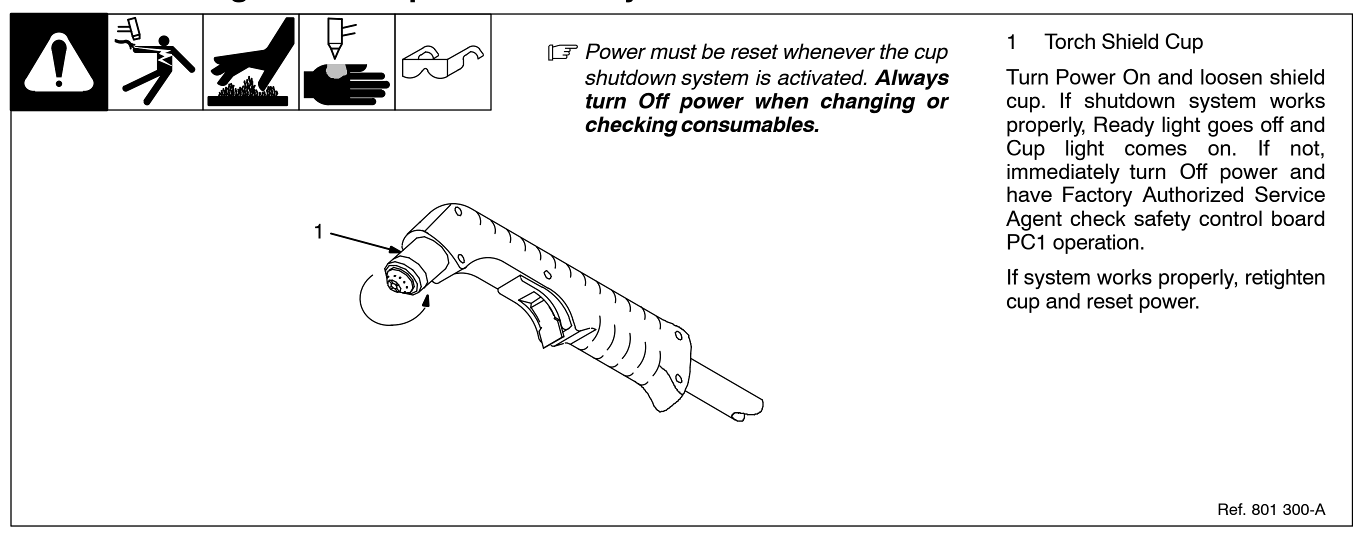
Turn power Off, and check shield cup connection (see torch Owner's Manual). Power must be reset whenever the cup shutdown is activated.

Check shield cup shutdown system once a week (see Section 6-3).

3 Temperature Light

Lights if power source overheats (see Section 4-2).

6-3. Checking Shield Cup Shutdown System



☞ *Power must be reset whenever the cup shutdown system is activated.* ***Always turn Off power when changing or checking consumables.***

1 Torch Shield Cup

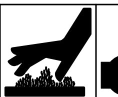
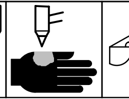
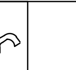
Turn Power On and loosen shield cup. If shutdown system works properly, Ready light goes off and Cup light comes on. If not, immediately turn Off power and have Factory Authorized Service Agent check safety control board PC1 operation.

If system works properly, retighten cup and reset power.

Ref. 801 300-A

6-4. Checking/Replacing Retaining Cup, Tip, And Electrode



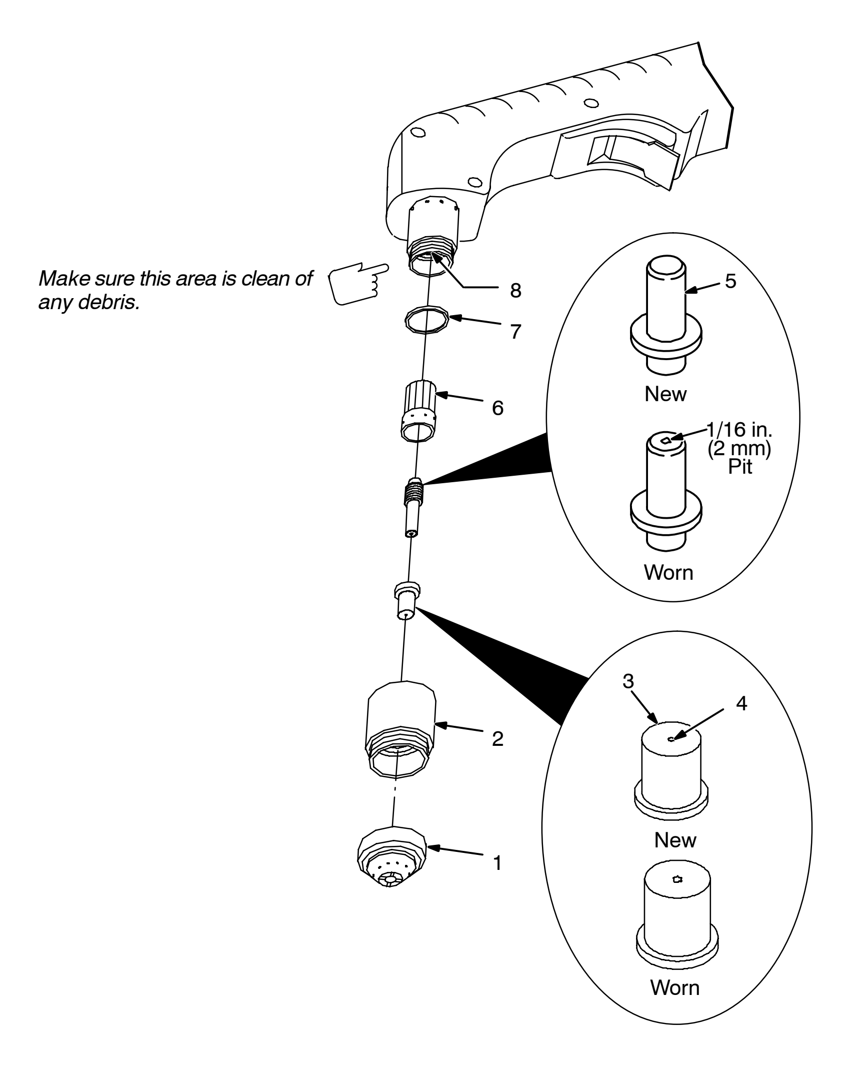
Overtightening will strip threads. Do not overtighten electrode, tip, and retaining cup during assembly. Do not cross-thread parts causing stripping. Use care during torch assembly and parts replacement.



Inspect shield cup, tip, and electrode for wear before cutting or whenever cutting speed has been significantly reduced. Do not operate torch without a tip or electrode in place. Be sure to use genuine replacement parts.

☞ *A good practice is to replace both the tip and electrode at the same time.*

Turn Off power source before checking torch parts.



Ref. 801 396-A / 801 405

Turn Off power source.

1 Drag Shield

2 Retaining Cup

Remove retaining cup. Check retaining cup for cracks, and replace if necessary.

3 Tip

4 Opening

Remove tip. Check tip, and replace if opening is deformed or 50% oversize. If inside of tip is not clean and bright, clean with steel wool. Be sure to remove any pieces of steel wool afterwards.

5 Electrode

Check electrode. If center has a pit more than a 1/16 in. (2 mm) deep, remove and replace electrode.

6 Swirl Ring

Remove swirl ring. Check ring, and replace if side holes are plugged.

7 O-Ring

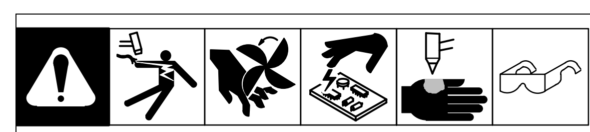
Check O-rings on torch. If needed, coat with thin film of silicone lubricant (part no. 169 231). Replace if damaged.

8 Plunger Area

Check this area for any debris or foreign material. Clean out if necessary.

Carefully reassemble parts in reverse order.

6-5. Troubleshooting



Trouble	Remedy
No pilot arc; difficulty in establishing an arc.	Clean or replace worn consumables as necessary (see torch Owner's Manual).
	Check for damaged torch or torch cable (see torch Owner's Manual).
No cutting output; Power light off; Trouble lights off; Ready light off; fan motor FM does not run.	Place Power switch in On position.
	Place line disconnect device in On position (see Section 4-9).
	Check line fuse(s) and replace if needed or reset circuit breakers (see Sections 4-7 and 4-9).
Pilot arc working; no cutting output; Power light on; Ready light on; Trouble lights off; fan motor running.	Be sure work clamp is connected.
	Clean or replace worn consumables as necessary (see torch Owner's Manual).
No gas/air flow; Power light on; Ready light on; Trouble lights off; fan motor running.	Have Factory Authorized Service Agent check for proper torch connections. Check operation of gas valve GS1, and check gas/air system for leaks.
Pressure Trouble light On; Ready light off.	Check for correct gas/air pressure adjustment (see Section 5-2).
	Check for sufficient gas/air supply pressure (see Section 4-6).
	Check for dirty air filter/regulator and clean, if needed (see manufacturer's instructions).
	Check air lines for leaks.
	Have Factory Authorized Service Agent check pressure switch and control board.
Cup Trouble light On; Ready light off.	Check torch shield cup (see Section 6-3). Reset power switch.
	Have Factory Authorized Service Agent check for proper torch connections.
Temperature Trouble light On; Ready light off.	Unit overheating. Allow fan to run; the Trouble light goes out when the unit has cooled.
	Have Factory Authorized Service Agent check control board.
Trouble lights not working.	Have Factory Authorized Service Agent check unit.
Power light flashing, Trouble lights off.	Reset power switch.
Arc outages when using a generator power source.	Set cutter Output (A) adjustment control to 45 amperes when using a generator that has an auxiliary power output rating between 8-10 kVA (see Section 4-10).
	Adjust generator engine rpm per manufacturer's specifications.

SECTION 7 – ELECTRICAL DIAGRAM

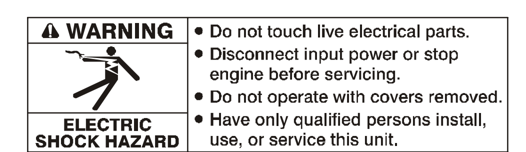
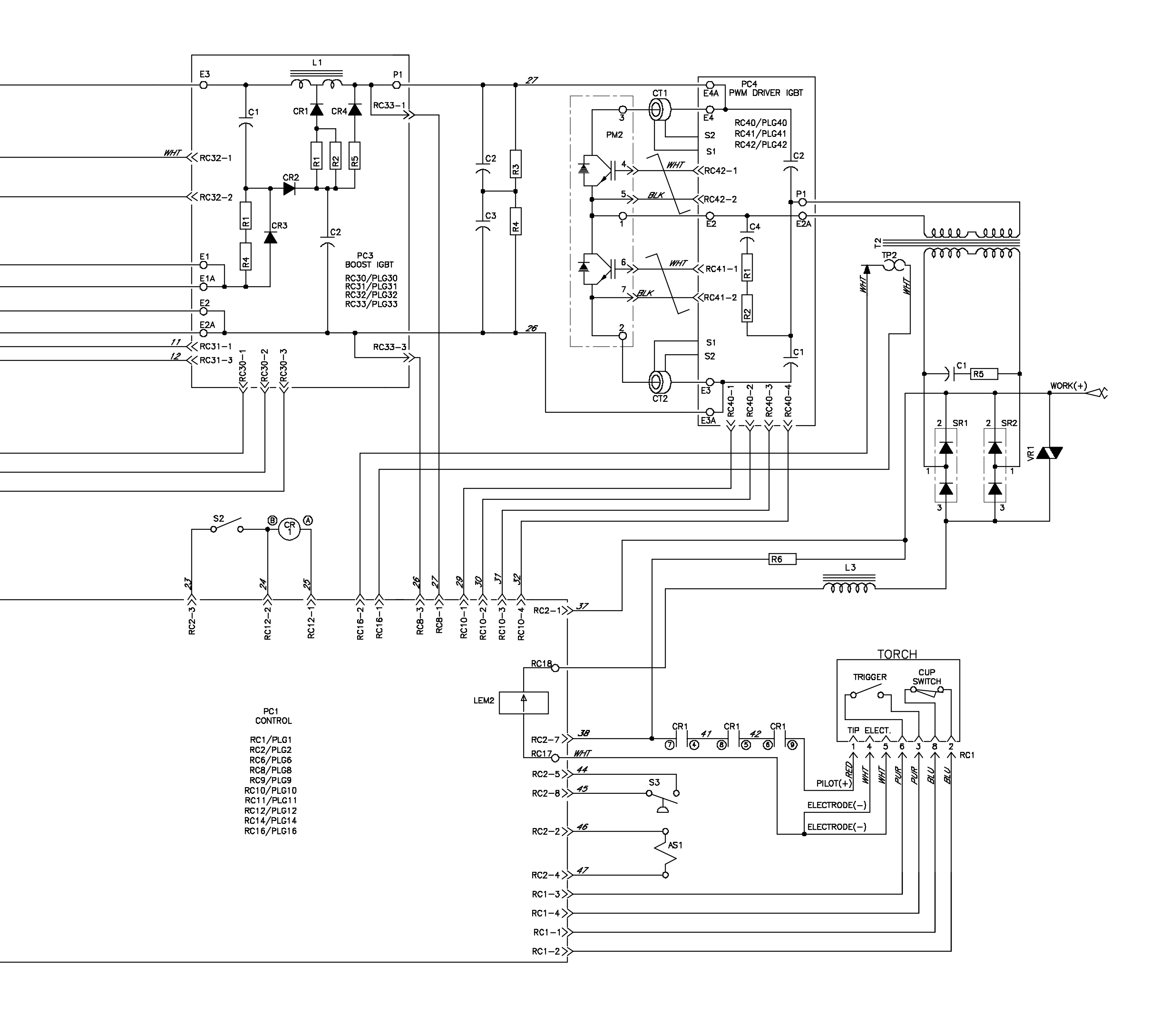


Figure 7-1. Circuit Diagram For Power Source


L1
E3
P1
C1
CR1
CR4
RC33-1
27
PC4
PWM DRIVER IGBT
CT1
E4A
E4
S2
S1
RC40/PLG40
RC41/PLG41
RC42/PLG42
PM2
WHT
RC32-1
R1
R2
R5
CR2
RC32-2
CR3
R4
C2
PC3
BOOST IGBT
RC30/PLG30
RC31/PLG31
RC32/PLG32
RC33/PLG33
E1
E1A
E2
E2A
RC31-1
RC31-3
RC30-1
RC30-2
RC30-3
RC33-3
26
C3
R3
RC42-1
BLK
RC42-2
RC41-1
RC41-2
C4
CT2
E3A
RC40-1
RC40-2
RC40-3
RC40-4
T2
TP2
WORK(+)
SR1
SR2
VR1
R6
L3
S2
CR
RC2-3
RC12-2
RC12-1
RC16-2
RC16-1
RC8-3
RC8-1
RC10-1
RC10-2
RC10-3
RC10-4
RC2-1
RC18
LEM2
PC1
CONTROL
RC1/PLG1
RC2/PLG2
RC6/PLG6
RC8/PLG8
RC9/PLG9
RC10/PLG10
RC11/PLG11
RC12/PLG12
RC14/PLG14
RC16/PLG16
RC2-7
RC17
RC2-5
RC2-8
RC2-2
RC2-4
RC1-3
RC1-4
RC1-1
RC1-2
S3
AS1
TORCH
TRIGGER
CUP SWITCH
TIP
ELECT.
PILOT(+)
ELECTRODE(-)
RED
PUR
BLU
RC1

200 445-A

SECTION 8 – PARTS LIST

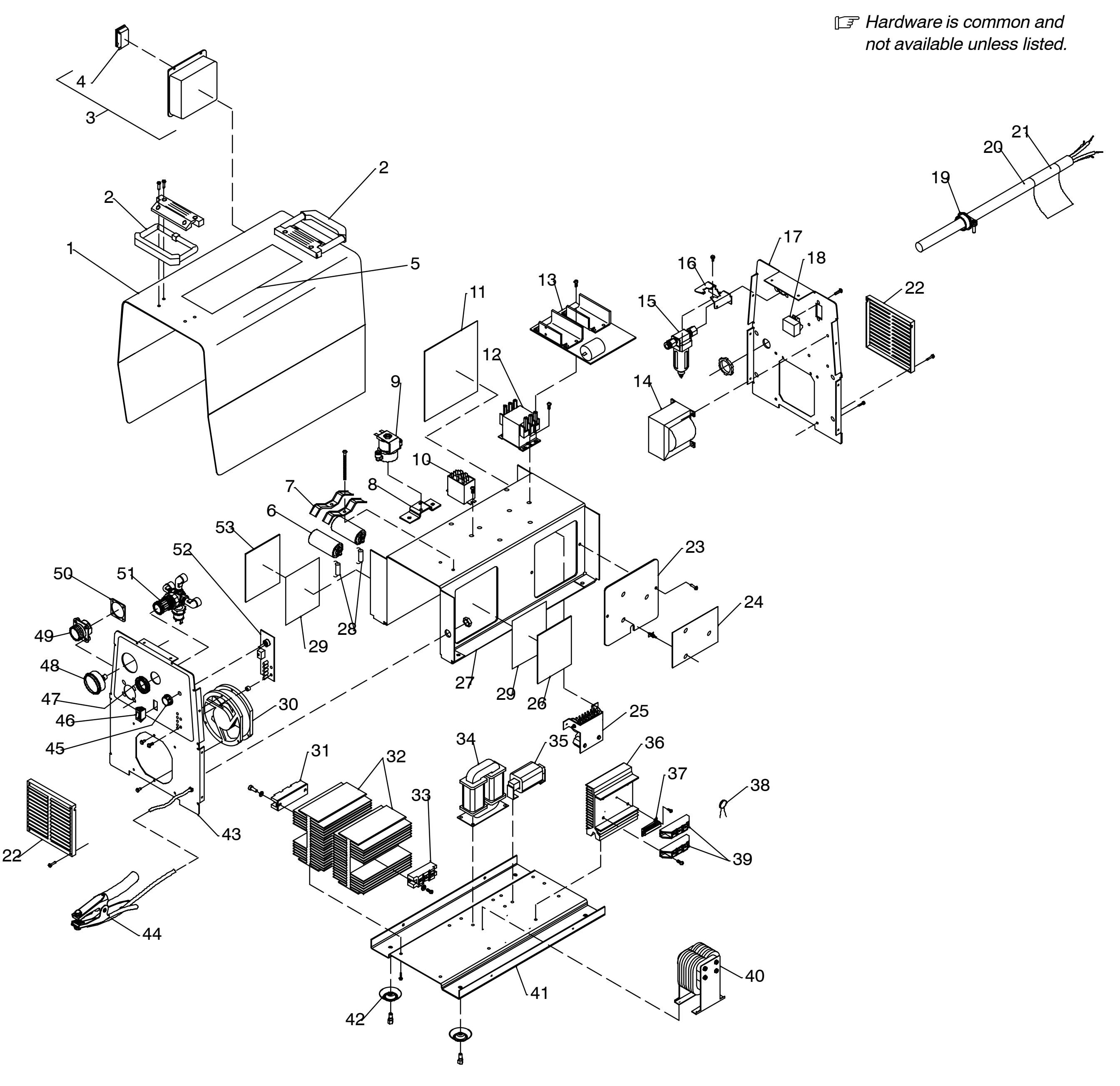


Figure 8-1. Main Assembly

Item No.	Dia. Mkgs.	Part No.	Description	Quantity

Figure 8-1. Main Assembly

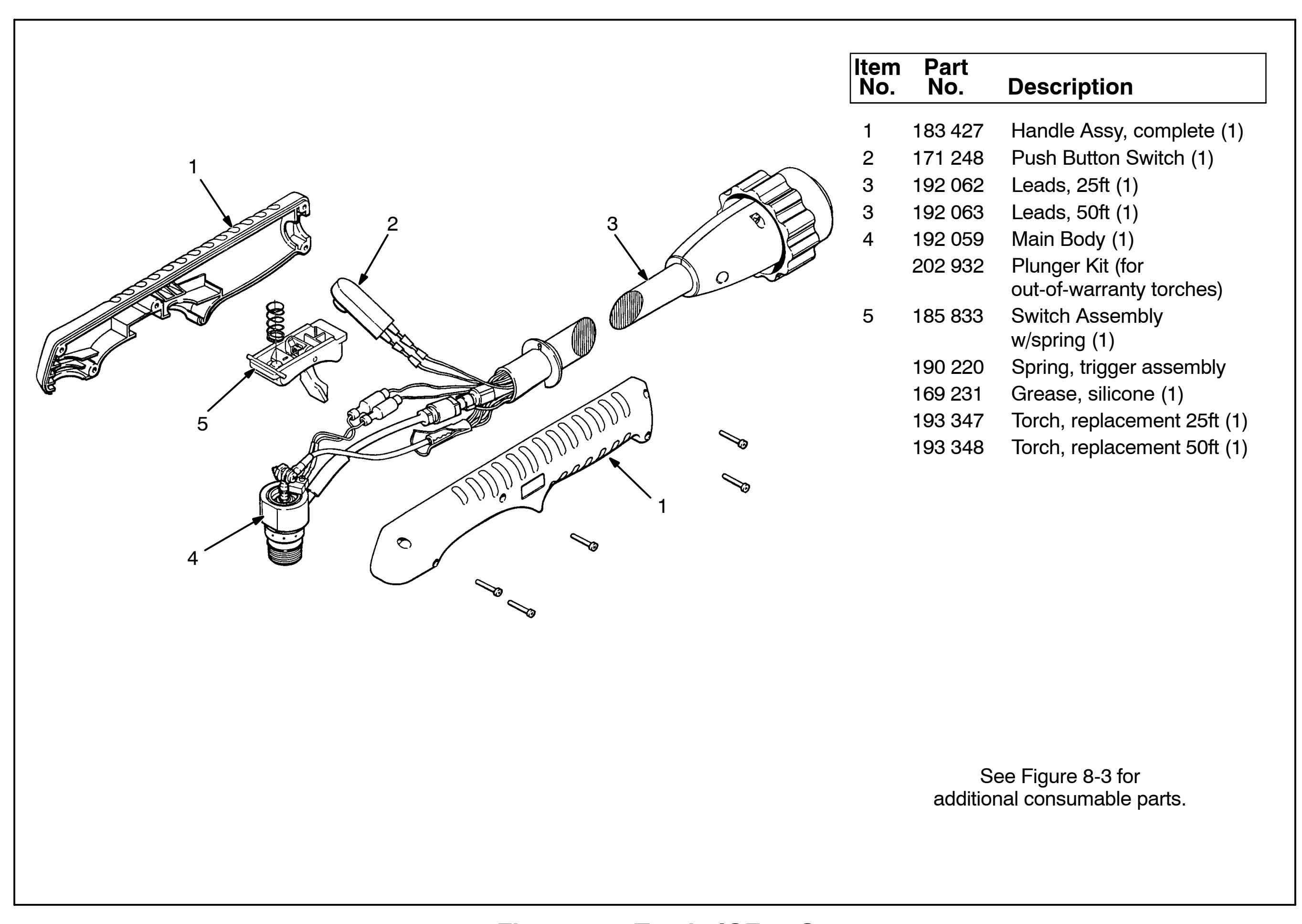
Item No.	Dia. Mkgs.	Part No.	Description	Quantity
		213 549	COVER ASSY (including)	1
1		+205 671	WRAPPER	1
2		208 015	HANDLE, rubberized carrying	2
3		204 326	CONSUMABLE STORAGE BOX w/DOOR (including)	1
4		089 899	LATCH, slide	1
5		192 460	LABEL, caution/warning	1
		206 305	LABEL, ICE 55C consumables	1
		121 389	LABEL, MILLER	2
6	C2,C3	193 236	CAPACITORS, buss	2
7		100026-001	CAPACITOR CLAMP	2
8		191 147	BRACKET, mounting solenoid	1
9	AS1	194 428	VALVE, w/fittings	1
10	CR1	191 744	RELAY, pta	1
11	PC1	196 648	CIRCUIT CARD ASSY, control	1
12	W1	194 525	CONTACTOR	1
13	PC2	200 375	CIRCUIT CARD ASSY, rectifier	1
14	T1	196 161	XFMR, aux	1
15		193 450	FILTER, air w/fittings	1
16		187 784	BRACKET, mtg filter	1
17		190 352	PANEL, rear	1
18	S1	194 517	SWITCH, rocker w/leads	1
19		010 916	CONNECTOR, clamp cable .750	1
20		+217 315	CABLE, power 13 ft 6 in 10ga 4C w/o strain relief	1
21		235 246	LABEL, warning electric shock input power	1
22		175 138	BOX, louver	2
23		191 639	DOOR, side	1
24	PC5	192 817	ASSY, pwb autoline w/o bracket	1
25	R6	196 047	RESISTOR ASSY	1
26	PC4	196 836	CIRCUIT CARD ASSY, driver pwm	1
27		196 163	WINDTUNNEL	1
28		193 675	RESISTOR, bleeder	1
29		190 313	INSULATOR, pc card	2
30	FM	175 084	FAN	1
31	PM1	200 392	KIT, IGBT (199 869 IGBT)	1
32		199 872	HEATSINK, IGBT	2
33	PM2	191 590	KIT, IGBT (914016-001 IGBT)	1
34	L1	205 676	ASSY, boost inductor	1
35	L3	204 079	INDUCTOR, 55 A 600 micro henry	1
36		199 873	HEATSINK, diode	1
37	C1, R5	219 971	SNUBBER ASSY	1
38	VR1	233 078	ASSY, varistor	1
39	SR1, SR2	191 503	KIT, diode (912006-001 diode modules)	2
40	T2	200 370	ASSY, transformer	1
41		196 162	BASE, aluminium	1
42		173 693	FOOT, mtg unit	4
43		190 362	PANEL, front	1
44		216 447	CABLE, work 25 ft 6 ga w/clamp strain rlf & term	1
44		217 891	CABLE, work 50 ft 6 ga w/clamp strain rlf & term	1
		213 619	CLAMP, work 300A stl chrome pld w/copper contacts	1
		213 620	CONTACT TIP, work clamp 300amp copper	2

+When ordering a component originally displaying a precautionary label, the label should also be ordered.

To maintain the factory original performance of your equipment, use only Manufacturer's Suggested Replacement Parts. Model and serial number required when ordering parts from your local distributor.

Item No.	Dia. Mkgs.	Part No.	Description	Quantity
			Figure 8-1. Main Assembly	
45		174 991	KNOB, pointer	1
46	S2	120 376	SWITCH, rocker SPDT 4A 250VAC On-None-On	1
47		189 554	NUT, panel mount	1
48		190 585	GAUGE, pressure air 0−160psi	1
49		193 308	DISCONNECT, quick ICE-55C	1
50		201 817	FLANGE, receptacle	1
51		193 447	REGULATOR/SWITCH, w/fittings	1
52	PC6	192 965	CIRCUIT CARD ASSY, LED/pot	1
53	PC3	196 832	CIRCUIT CARD ASSY, boost	1
			NAMEPLATE, specific front or rear (order by model and serial no.)	1

+When ordering a component originally displaying a precautionary label, the label should also be ordered.
To maintain the factory original performance of your equipment, use only Manufacturer's Suggested Replacement Parts. Model and serial number required when ordering parts from your local distributor.



Item No.	Part No.	Description
1	183 427	Handle Assy, complete (1)
2	171 248	Push Button Switch (1)
3	192 062	Leads, 25ft (1)
3	192 063	Leads, 50ft (1)
4	192 059	Main Body (1)
	202 932	Plunger Kit (for out-of-warranty torches)
5	185 833	Switch Assembly w/spring (1)
	190 220	Spring, trigger assembly
	169 231	Grease, silicone (1)
	193 347	Torch, replacement 25ft (1)
	193 348	Torch, replacement 50ft (1)

Figure 8-2. Torch, ICE-55C

Drag Shield 192 053
Retaining Cup 192 050
Tip 192 051
Electrode 192 047
Swirl Ring 192 049
O−Ring 169 232
Standard Cutting
Apply silicone grease (169 231) before installing.

Shield 192 058
Machine Cutting
40A Tip 192 052

Deflector 177 888
Retaining Cup 192 050
55A Tip 192 056
Electrode 192 048
Extended Cutting — 1/8” (3mm) stand−off recommended

Shield 192 203
Retaining Cup 192 050
Tip 192 204
Electrode 192 047
Gouging

ICE−55C CONSUMABLES

CAUTION

FAILURE TO RE– PLACE WORN TIP OR ELECTRODE WILL RUIN TORCH AND VOID WARRANTY.

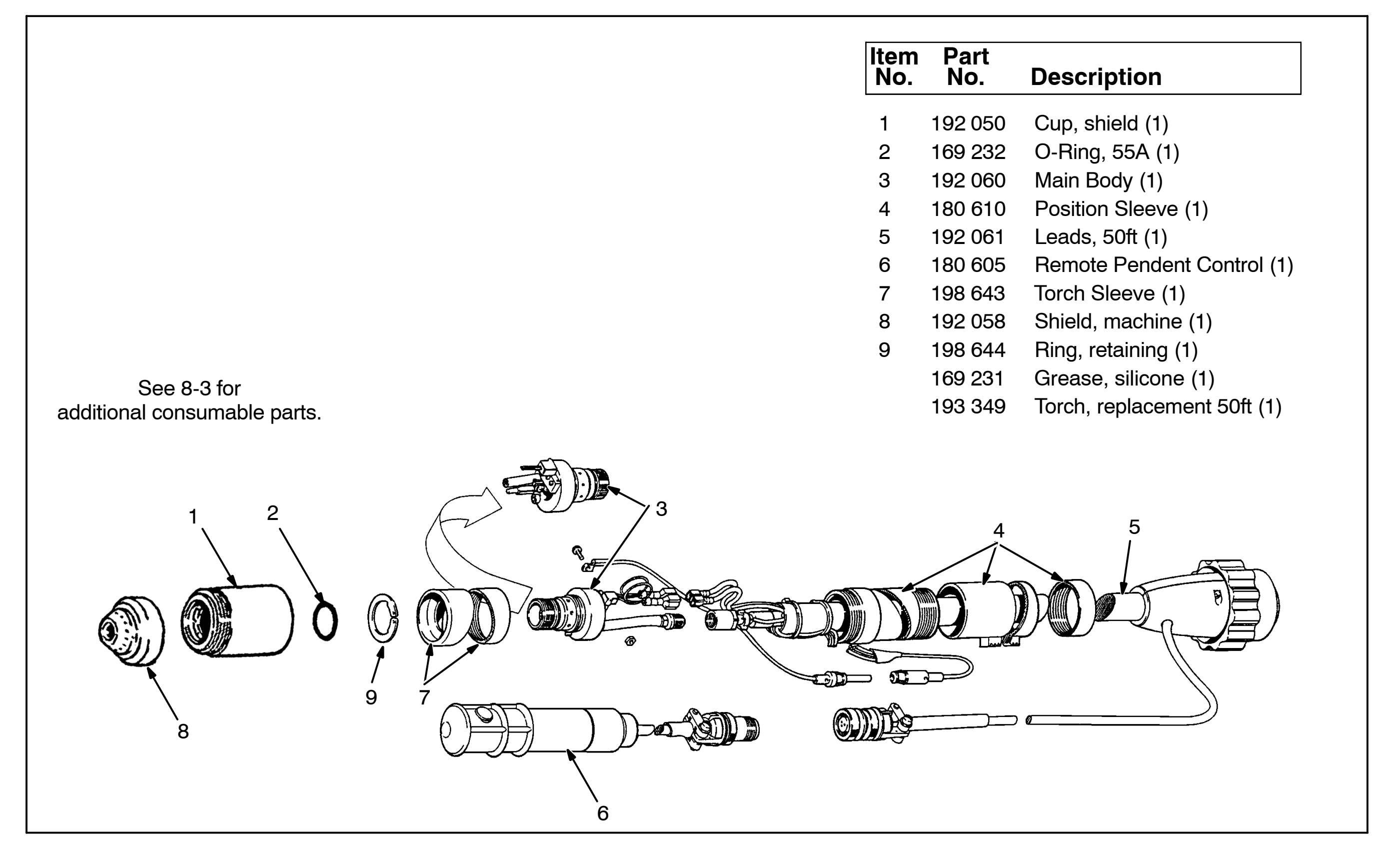
Turn off power before checking torch parts.

Check before each use and hourly during operation.

206 305−A

206 305-A

Figure 8-3. Consumable Parts For ICE-55C And 55CM



Item No.	Part No.	Description
1	192 050	Cup, shield (1)
2	169 232	O-Ring, 55A (1)
3	192 060	Main Body (1)
4	180 610	Position Sleeve (1)
5	192 061	Leads, 50ft (1)
6	180 605	Remote Pendent Control (1)
7	198 643	Torch Sleeve (1)
8	192 058	Shield, machine (1)
9	198 644	Ring, retaining (1)
	169 231	Grease, silicone (1)
	193 349	Torch, replacement 50ft (1)

Figure 8-4. Torch, ICE-55CM

Notes



Effective January 1, 2010
(Equipment with a serial number preface of MA or newer)

This limited warranty supersedes all previous Miller warranties and is exclusive with no other guarantees or warranties expressed or implied.

Warranty Questions?

Call
1-800-4-A-MILLER
for your local
Miller distributor.

Your distributor also gives you ...

Service
You always get the fast, reliable response you need. Most replacement parts can be in your hands in 24 hours.

Support
Need fast answers to the tough welding questions? Contact your distributor. The expertise of the distributor and Miller is there to help you, every step of the way.



LIMITED WARRANTY – Subject to the terms and conditions below, Miller Electric Mfg. Co., Appleton, Wisconsin, warrants to its original retail purchaser that new Miller equipment sold after the effective date of this limited warranty is free of defects in material and workmanship at the time it is shipped by Miller. THIS WARRANTY IS EXPRESSLY IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING THE WARRANTIES OF MERCHANTABILITY AND FITNESS.

Within the warranty periods listed below, Miller will repair or replace any warranted parts or components that fail due to such defects in material or workmanship. Miller must be notified in writing within thirty (30) days of such defect or failure, at which time Miller will provide instructions on the warranty claim procedures to be followed.

Miller shall honor warranty claims on warranted equipment listed below in the event of such a failure within the warranty time periods. All warranty time periods start on the delivery date of the equipment to the original end-user purchaser, and not to exceed one year after the equipment is shipped to a North American distributor or eighteen months after the equipment is shipped to an International distributor.

1. 5 Years Parts — 3 Years Labor
   * Original main power rectifiers only to include SCRs, diodes, and discrete rectifier modules
2. 3 Years — Parts and Labor
   * Engine Driven Welding Generators
     (NOTE: Engines are warranted separately by the engine manufacturer.)
   * Inverter Power Sources (Unless Otherwise Stated)
   * Plasma Arc Cutting Power Sources
   * Process Controllers
   * Semi-Automatic and Automatic Wire Feeders
   * Smith 30 Series Flowgauge and Flowmeter Regulators (No Labor)
   * Transformer/Rectifier Power Sources
   * Water Coolant Systems (Integrated)
3. 2 Years — Parts
   * Auto-Darkening Helmet Lenses (No Labor)
4. 1 Year — Parts and Labor Unless Specified
   * Automatic Motion Devices
   * CoolBelt and CoolBand Blower Unit (No Labor)
   * External Monitoring Equipment and Sensors
   * Field Options
     (NOTE: Field options are covered for the remaining warranty period of the product they are installed in, or for a minimum of one year — whichever is greater.)
   * Flowgauge and Flowmeter Regulators (No Labor)
   * RFCS Foot Controls (Except RFCS-RJ45)
   * Fume Extractors
   * HF Units
   * ICE Plasma Cutting Torches (No Labor)
   * Induction Heating Power Sources, Coolers, and Electronic Controls/Recorders
   * Load Banks
   * Motor Driven Guns (w/exception of Spoolmate Spoolguns)
   * PAPR Blower Unit (No Labor)
   * Positioners and Controllers
   * Racks
   * Running Gear/Trailers
   * Spot Welders
   * Subarc Wire Drive Assemblies
   * Water Coolant Systems (Non-Integrated)
   * Weldcraft-Branded TIG Torches (No Labor)
   * Work Stations/Weld Tables (No Labor)
5. 6 Months — Parts
   * Batteries
   * Bernard Guns (No Labor)
   * Tregaskiss Guns (No Labor)
6. 90 Days — Parts
   * Accessory (Kits)
   * Canvas Covers
   * Induction Heating Coils and Blankets, Cables, and Non-Electronic Controls
   * M-Guns
   * MIG Guns and Subarc (SAW) Guns
   * Remote Controls and RFCS-RJ45
   * Replacement Parts (No labor)
   * Roughneck Guns
   * Spoolmate Spoolguns

Miller's True Blue® Limited Warranty shall not apply to:

1. **Consumable components; such as contact tips, cutting nozzles, contactors, brushes, relays, work station table tops and welding curtains, or parts that fail due to normal wear. (Exception: brushes and relays are covered on all engine-driven products.)**
2. Items furnished by Miller, but manufactured by others, such as engines or trade accessories. These items are covered by the manufacturer's warranty, if any.
3. Equipment that has been modified by any party other than Miller, or equipment that has been improperly installed, improperly operated or misused based upon industry standards, or equipment which has not had reasonable and necessary maintenance, or equipment which has been used for operation outside of the specifications for the equipment.

MILLER PRODUCTS ARE INTENDED FOR PURCHASE AND USE BY COMMERCIAL/INDUSTRIAL USERS AND PERSONS TRAINED AND EXPERIENCED IN THE USE AND MAINTENANCE OF WELDING EQUIPMENT.

In the event of a warranty claim covered by this warranty, the exclusive remedies shall be, at Miller's option: (1) repair; or (2) replacement; or, where authorized in writing by Miller in appropriate cases, (3) the reasonable cost of repair or replacement at an authorized Miller service station; or (4) payment of or credit for the purchase price (less reasonable depreciation based upon actual use) upon return of the goods at customer's risk and expense. Miller's option of repair or replacement will be F.O.B., Factory at Appleton, Wisconsin, or F.O.B. at a Miller authorized service facility as determined by Miller. Therefore no compensation or reimbursement for transportation costs of any kind will be allowed.

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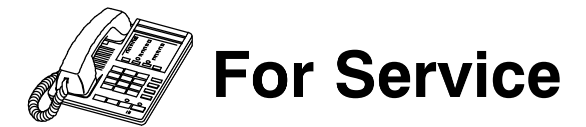
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Owner's Record

Please complete and retain with your personal records.

Model Name	Serial/Style Number
Purchase Date	(Date which equipment was delivered to original customer.)
Distributor	
Address	
City	
State	Zip



For Service

Contact a DISTRIBUTOR or SERVICE AGENCY near you.

Always provide Model Name and Serial/Style Number.

Contact your Distributor for:	Welding Supplies and Consumables Options and Accessories Personal Safety Equipment Service and Repair Replacement Parts Training (Schools, Videos, Books) Technical Manuals (Servicing Information and Parts) Circuit Diagrams Welding Process Handbooks To locate a Distributor or Service Agency visit www.millerwelds.com or call 1-800-4-A-Miller
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